

A REVISION OF *MEZILAURUS* (LAURACEAE)¹

HENK VAN DER WERFF²

ABSTRACT

The neotropical genus *Mezilaurus* (Lauraceae), which consists of 18 species and is best represented in the drainage area of the Amazon, is revised. *Clinostemon*, a genus of two species recently separated from *Licaria* and reinstated on its own, is included here in *Mezilaurus*. Eight species, *Mezilaurus caatingae* van der Werff, *M. duckei* van der Werff, *M. glaucophylla* van der Werff, *M. micrantha* van der Werff, *M. opaca* Kubitzki & van der Werff, *M. palcazuensis* van der Werff, *M. pyriflora* van der Werff, and *M. quadrilocellata* van der Werff are described as new. One new name, *M. thoroflora* van der Werff, and a new combination, *M. mahuba* (Sampaio) van der Werff, are published.

Mezilaurus comprises 18 species, occurring from Costa Rica to southern Brazil. The majority of the species are found in the drainage area of the Amazon River and adjacent Guayana. The type species, *M. navalium*, is restricted to the Atlantic rain forests of southern Brazil; two species (of which one remains undescribed due to insufficient material) are shrubs from the cerrado vegetation. Fourteen species are Amazonian and have been reported from a variety of habitats. Ten Amazonian species, ranging from shrubs to tall trees, occur in terra firme vegetation, frequently in xeromorphic forests on white sand. One species, *M. mahuba*, is restricted to flooded forest. Three species are known to occur in secondary vegetation (*M. thoroflora*, *M. synandra* and *M. lindaviana*), although it is not clear whether these are typical of secondary vegetation or were left standing when the primary forest was cut. When cutting primary forest throughout the Neotropics, the local people tend to leave some economically useful species intact for future harvesting. Lauraceae, widely used for timber, are therefore frequently found as isolated trees in pastures or similarly disturbed habitats. No habitat information is available for the Colombian species, which is only known from Chigorodó in northern Antioquia. The Costa Rican species occurs in wet lowland forest near the Pacific Coast.

Most species of *Mezilaurus* are collected infrequently, and I have seen more than ten collections for only two species (*M. itauba* and *M. lindaviana*). That many *Mezilaurus* species are large or middle-size trees and all have small, greenish flowers usually less than 2 mm long no doubt explains the paucity of collections. The

genus is greatly undercollected and much more material is needed for a better taxonomic understanding.

The main use of *Mezilaurus* is for timber. The species are locally well known and their hard wood is much used for boat building and construction. Mez (1889) mentioned that the fruits of *M. itauba* are edible. On the label of Fróes 12152 (*Mezilaurus pyriflora*) it is stated that the wood causes injuries to the skin, presumably a kind of dermatitis.

The present revision was undertaken because it became clear that the genus *Clinostemon* should be merged with *Mezilaurus*. This led to a closer look at recent collections, during which several undescribed species were found. I now recognize 18 species in *Mezilaurus*, which more than doubles the number of species recognized by Kostermans (1938).

MATERIALS

This study is based both on older collections, already cited by Kostermans (1938), and recent collections personally selected during visits to major American and European herbaria or received on loan with other unidentified Lauraceae. In my experience the genus was unrecognized in many herbaria. Unfortunately, I have not yet had the opportunity to visit the leading Brazilian herbaria. I fully expect that such visits will yield additional taxa, not only from the Amazonian forests, but also from the cerrado vegetation and possibly the Atlantic rain forests. Although this study is therefore incomplete, I hope it will kindle the interest of neotropical botanists in this group of small-flowered Lauraceae.

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² Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166, U.S.A.

TAXONOMIC HISTORY

The first species of *Mezilaurus* was published by Allemão (1848) as *Silvia navalium*. Meissner (1864) recognized that *Silvia* Allemão was a later homonym of *Silvia* Vellozo and proposed the new name *Silvaea*. Unfortunately, *Silvaea* Meissner is a later homonym of *Silvaea* Phillipi. O. Kuntze (1891) proposed another new name, *Mezia*, to replace *Silvia* Allemão, but the name *Mezia* O. Kuntze was predated by *Mezia* Schwacke, a genus of Malpighiaceae. Finally, Taubert (1892) proposed the name *Mezilaurus*, which Mez (1892) accepted. He included seven species in the genus. Pax (1897), overlooking the publication of *Mezilaurus*, proposed *Neosilvia* as a new name for *Silvia* Allemão. *Neosilvia* is therefore a superfluous name. The name *Mezilaurus* was not universally accepted at first. Even Mez (1904, 1920, 1924) used the name *Silvia* again. Ducke (1930, 1935) published several new species under the generic name *Silvia*. Kostermans's revision (1938) definitively established the use of *Mezilaurus* Taubert.

During the nineteenth century, several species now placed in *Mezilaurus* were described in other genera, mostly in genera now included in *Licaria*. Meissner (1864) described three species in *Acrodictidium* and one in *Oreodaphne* (a synonym of *Ocotea*). Bentham in Hooker (1878) transferred two of these to *Misanteca* (a synonym of *Licaria*) and Bentham and Hooker (1880) placed the other two (including the type species of *Mezilaurus*) in *Endiandra*, an Old World genus. Mez (1889) recognized six species in *Mezilaurus* (as *Silvia*), the type species, the four species described by Meissner (1864), and a sixth species now included in *Licaria*. Kostermans (1938) accepted eight species of *Mezilaurus*, four of Mez's species and four described since 1889 by Mez and Ducke. Allen (1964) described two new species of *Mezilaurus* from Venezuela.

Kuhlmann and Sampaio (1928) published the monotypic genus *Clinostemon* based on *Acrodictidium mahuba* Samp. Kostermans (1938) did not accept this genus and placed it in *Licaria*. Later Allen (1948) described a new species closely related to *Licaria mahuba* and noted the resemblance to *Mezilaurus*. Recent investigations (Kubitzki et al., 1979) have shown that these two species do not belong in *Licaria* and are more closely related to or congeneric with *Mezilaurus*. In this paper both are included in *Mezilaurus*.

The eight species recognized in Kostermans's

monograph are all maintained in this publication. The increase in the number of *Mezilaurus* species is partly due to the inclusion of *Clinostemon* in *Mezilaurus* and partly due to recent collections that represent undescribed species.

GENERIC RELATIONSHIPS

One of the main taxonomic difficulties in Lauraceae is that many of the genera are poorly defined. This is reflected in the various infrafamilial classification schemes and the frequency with which species are transferred between various genera. During the last 30 years generic relationships within the Lauraceae have been discussed in three papers (Kostermans, 1957; Hutchinson, 1964; and Richter, 1981).

Kostermans (1957) attached much importance to the fruit (with or without cupule) and less importance to the number of anther cells; he placed *Mezilaurus* in the subtribe Beilschmiedinae of the tribe Perseeae, close to *Endiandra*, and noted, as did Bentham and Hooker (1880), a similarity to *Endiandra*. He also stated that *Endiandra* and *Mezilaurus* differ in anther shape and the positions of their leaves. Additional differences are the very fine reticulation of the leaves and the large, spreading tepals in many species of *Endiandra* (comparable to tepals in *Nectandra*), which are very unlike the small, erect, scale-like tepals in *Mezilaurus*. These differences greatly outweigh the similarities between *Endiandra* and *Mezilaurus* (number of fertile stamens, number of anther cells, fruit more or less without cupule) and *Endiandra* is probably not a close relative of *Mezilaurus*.

Hutchinson (1964) considered the number of anther cells more important than the development of the cupule. He placed *Mezilaurus* next to *Misanteca*, but the distribution data given under *Misanteca* strongly suggest that Hutchinson, as did Bentham and Hooker (1880), included in his *Misanteca* two Brazilian species here included in *Mezilaurus*.

As can be seen from the taxonomic history of *Mezilaurus*, its species frequently have been placed in *Licaria* (or its synonyms *Acrodictidium* and *Misanteca*). These two genera have in common that they are the only neotropical Lauraceae with three fertile, two-celled stamens. The general flower shape of species belonging to these two genera can be quite similar and a generic separation based solely on flowers can be very difficult. Fortunately, other characters readily

identify the genera: *Mezilaurus* has the leaves always clustered at the tips of the branches, *Licaria* never; in *Mezilaurus* the cupule consists of a small, platelike disk, in *Licaria* it grows into a rather large, double-rimmed cup, and the inflorescence of *Mezilaurus* is a double raceme (Figs. 3, 8C), an inflorescence type never found in *Licaria*. Kubitzki et al. (1979) partly enumerated these differences and discussed the placement of *Licaria mahuba* (Samp.) Kostermans and *L. maguireana* Allen. They concluded that these species did not belong in *Licaria* and resurrected the generic name *Clinostemon* to accommodate them. *Clinostemon* was considered a close relative of *Mezilaurus*, the only difference being the presence of staminodia in *Clinostemon* and their absence in *Mezilaurus*. The two *Clinostemon* species also share large, obovate leaves with an abruptly rounded base.

The taxonomic importance of absence/presence of staminodia in defining genera of Lauraceae is open to discussion. In some genera staminodia are consistently present (*Persea*, *Phoebe*); in others they may be present or absent (*Aiouea*, *Aniba*, *Licaria*, *Ocotea*). This suggests that a generic separation based only on presence/absence of staminodia is weak, especially because the staminodia are small, ca. 0.5 mm, and not easy to find. The discovery of two undescribed species in Colombia and Costa Rica with the leaf shape and size of a *Mezilaurus*, but with staminodia like *Clinostemon*, is another reason to place *Clinostemon* in synonymy under *Mezilaurus*.

Richter (1981) amply discussed the wood and bark anatomy of the Lauraceae. He found that within the Lauraceae, *Mezilaurus* occupied an isolated position and was easily recognized both on wood and bark characters. He also found that the wood (bark was not available) of the two *Clinostemon* species was either undistinguishable or very similar to *Mezilaurus* and suggested that *Clinostemon* should be placed very close to *Mezilaurus*, or merged with it, a conclusion he published earlier in Kubitzki et al. (1979). The great similarity in wood anatomy plus the isolated position of *Mezilaurus/Clinostemon* in the Lauraceae is the second reason to merge these two genera. Richter (1981) also found that *Licaria* and *Endiandra* are, as far as wood anatomy is concerned, not closely related to *Mezilaurus*. The genus most closely related to *Mezilaurus* by wood characters is *Anaueria*, a monotypic genus incompletely known from a few collections in Brazil and Peru. Kostermans (1952) and Hutch-

inson (1964) both placed *Anaueria* in *Beilschmiedia*; Kostermans mentioned, without giving details, that he did so as a result of studying additional herbarium material from Rio de Janeiro. Neither *Anaueria* nor *Beilschmiedia* is likely to be confused with *Mezilaurus*, since they have flowers with six or nine fertile stamens and never have clustered leaves.

Two species described in this paper merit additional comments. *Mezilaurus quadrilocellata* and *M. glaucophylla* have an unusual distribution, being only known from northern Colombia and Costa Rica. All other *Mezilaurus* species occur in the Amazonian forests or other parts of Brazil. Secondly, *M. quadrilocellata* and *M. glaucophylla* have staminodia (as do the species formerly placed in *Clinostemon*) and the leaf shape of *Mezilaurus* species (quite unlike the species formerly included in *Clinostemon*). Thus, they link *Mezilaurus* with *Clinostemon*. Moreover, they are the only species in the genus with four anther cells on each stamen. Given the importance frequently attached to the number of anther cells and the number of fertile stamens, the presence of three four-celled anthers (not found in any other New World Lauraceae) could be sufficient for the recognition of a new genus. However several other genera include species with two-celled and four-celled anthers, and because other characters (leaves clustered at branch tip, shape of the inflorescence) point toward *Mezilaurus*, I include these species in *Mezilaurus*.

As a result of the transfer of *Clinostemon* and the inclusion of *Mezilaurus quadrilocellata* and *M. glaucophylla*, my concept of *Mezilaurus* is wider than has been used by previous authors. I regard as diagnostic characters the leaf position (clustered at the tips of branches), the small, platelike cupule (but fruits from most species are not yet known), the type of inflorescence (a double raceme), and the presence of three fertile stamens. Richter (1981) discussed diagnostic wood and bark characters.

In conclusion, *Mezilaurus* shows in floral characters a strong resemblance to *Licaria*. However, these two genera differ in wood anatomy, cupule shape, leaf position, and inflorescence type. Wood anatomy suggests a close relationship between *Mezilaurus* and *Anaueria*, but these two genera differ in characters of leaf position, inflorescence type, and number of fertile anthers. A close relationship between *Mezilaurus* and *Endiandra* is very unlikely. Currently available information indicates that *Mezilaurus*, including *Clinoste-*

mon, is endemic to the Neotropics, and that it occupies an isolated position in the family.

MORPHOLOGY AND TAXONOMIC CHARACTERS

Mezilaurus species range from small trees or shrubs (the cerrado species) to tall forest trees much valued for their timber. The twigs are generally thick, show conspicuous leaf scars, and are often covered with a thick bark layer.

Leaves. The leaves in all species are pinnately veined. The lateral veins frequently arch upward and become connected with the more distal lateral vein. The texture of the leaves is variable; most species have chartaceous leaves, but a few have coriaceous leaves in which secondary and tertiary venation is poorly visible. Conspicuous gland dots in the leaves occur rarely. The leaves generally turn dark upon drying.

Characteristic for the genus is the fact that the leaves are always clustered at the tips of the branches. Young shoots grow initially rapidly without developing leaves; after this elongating period, leaves are formed at the tip of the young branch. Such branches may have several clusters of leaves, representing different growing seasons. I will call this growth pattern long shoot–short shoot. Under unfavorable conditions (several *Mezilaurus* species are reported from white sand forests or caatinga forests) the difference between the long shoots and short shoots becomes less pronounced and the growth pattern may seem a succession of short shoots, with only one cluster of leaves at the tip of the branches. However, I think the difference between long shoot–short shoot or short shoot growth pattern is quantitative, not qualitative.

Species with clustered leaves of the long shoot–short shoot pattern occur regularly, but not frequently, in several other neotropical genera of Lauraceae (*Aniba*, *Endlicheria*, *Nectandra*, *Ocotea*, *Phoebe*, and *Pleurothyrium*). However, only in *Mezilaurus* is this clustered leaf pattern characteristic or dominant. The non-*Mezilaurus* species with clustered leaves are rarely confused with *Mezilaurus*; even in vegetative state they are readily separated by conspicuous pubescence or leaf color differences. Only one species, *Ocotea rubra*, very closely resembles *Mezilaurus* in sterile state. However, its flowers with nine four-celled stamens and fruit with a large cupule make identification easy.

Nearly all species of *Mezilaurus* have elliptic to obovate leaves. The base of the leaves, how-

ever, offers some useful characters. Four species, *Mezilaurus mahuba*, *M. pyriflora*, *M. thoroiflora*, and *M. duckei*, have large leaves (to 60 cm long) which become gradually narrowed toward the base; at the base the leaves are abruptly narrowed, becoming rounded or even cordate. Three species, *M. subcordata*, *M. quadrilocellata*, and *M. glaucophylla*, have an obtuse or rounded leaf base with a distinct petiole, 2–6 cm long. In these three species the leaf shape is slightly obovate or ovate. In all other species (with the exception of *M. crassiramea*), the leaf base is gradually attenuate or decurrent on the petiole. Most of these species have a petiole. Three species, however, *M. caatingae*, *M. crassiramea* and *M. decurrens*, have sessile leaves or nearly so. In some collections of *M. crassiramea* the leaf base is gradually narrowed, in others it is rather abruptly narrowed. In this species the petioles, if present, are less than 1 cm long.

Pubescence. There is not much variation in pubescence within *Mezilaurus*. Two species, *M. crassiramea* and *M. lindaviana*, have erect pubescence on the lower surface of the leaves; this can be quite sparse in *M. lindaviana*, however. The other species have varying amounts of appressed pubescence on leaves, stems, terminal buds, and inflorescences. These varying amounts of pubescence have little diagnostic value.

Inflorescence. The inflorescence of *Mezilaurus* consists of a compound raceme (dibothryum, see Weberling, 1981, 1985). This inflorescence type is present without modifications in *M. crassiramea*, *M. lindaviana*, *M. mahuba*, *M. pyriflora*, *M. thoroiflora*, and *M. duckei*. Short tertiary axes are sometimes present in *M. glaucophylla* and *M. quadrilocellata*. In the other species the inflorescences are smaller and the flowers are not evenly distributed along the lateral branchlets of the inflorescence, but are clustered at the tips of these branchlets. The occasional occurrence of flowers along the branchlets suggests that the clustered flowers are a derived condition. It is worth noting that the species with a well-developed dibothryum have larger (often much larger) inflorescences and have usually smaller flowers than the species with clustered flowers. A dibothryum is a rare inflorescence type among other neotropical Lauraceae (if it ever occurs outside of *Mezilaurus*).

The inflorescence type of one *Mezilaurus* species, *M. decurrens*, is not known due to the fragmentary nature of the single available specimen.

Flowers. In the following discussion I consider only mature flowers. Because it is difficult to tell whether a flower is mature or not in *Mezilaurus*, I define a mature flower as one with opened anther cells. In buds or young flowers diagnostic characters are often difficult to see.

The flowers of *Mezilaurus* are unusually difficult to dissect. In addition to their small size, the floral tube contains much mucilage, which has usually hardened during drying. Softening the flowers requires boiling for at least one hour. After softening, the mucilage becomes viscid and sticky and the dissected floral parts frequently stick tightly to the floral tube. Therefore, I have rarely relied on characters of the floral parts to separate taxa, especially because other characters are available.

Dimensions given for flowers and their parts should be accepted with some reservation. In order to dissect the flowers, it is necessary to boil them. During the boiling the flowers swell; the degree of size increase depends on the duration of boiling. I have recorded flowers that measured 1.3 mm dry as swelling to 1.7 mm after boiling. Similar increases in size were found for the stamens as well. Only rarely have I used flower sizes in the key and, in these cases, flower sizes are taken from dry flowers. The tepals are generally small and equal. The exceptions are *M. glaucophylla* and *M. quadrilocellata*, in which the outer three tepals are smaller than the inner three.

With the exception of three species (*Mezilaurus caatingae*, *M. palcazuensis*, and *M. mahuba*), all species have clearly pedicellate flowers. Stam-inodia (which are not easy to find due to their small size) are present in six species (*M. duckei*, *M. glaucophylla*, *M. mahuba*, *M. pyriflora*, *M. quadrilocellata*, and *M. thoroflora*), and only *M. mahuba* has glands at the base of the fertile stamens.

The most interesting variation of floral structures is found in the shapes and positions of anthers. In most neotropical Lauraceae the anthers have the shape of erect stalked plates with the anther cells on the inner or outer surface (for instance, in *Persea*, *Phoebe*, *Nectandra*, and *Ocotea*). In several of the genera with two-celled anthers the plate shape of the anthers is less pronounced or lost and the anther cells are situated at or near the tip of the anthers (*Aniba*, *Licaria*). In several species of *Licaria* the stamens are shaped like columns with the anther cells situated near the apex and here the difference be-

tween filament and anther has disappeared. In a few species of *Mezilaurus* (*M. duckei*, *M. glaucophylla*, *M. pyriflora*, and *M. quadrilocellata*) a similar arrangement is found. Here the stamens remain included in the erect tepals and the anther cells are situated at the tips of the stamens. In *M. glaucophylla* and *M. quadrilocellata*, the only species with four anther cells on each stamen, the tips of the stamens are flattened and form a small platform on which the anther cells are situated. Thus, by looking from the outside in the flowers, one sees the 12 anther cells as small pores. In these four species the anther cells are situated apically and also open apically; that is, the flaps open upward.

Mezilaurus subcordata is the only species with the anther cells situated introrse or introrse-lateral; in all remaining species the anther cells are extrorse, situated on the outer face of the stamen. Here the anther cells are more or less exserted, tend to be relatively large, and, most interesting, the stamens develop a dorsal ridge on which the anther cells are situated. The ridge is usually about as long as the anther cells and appears as an outward-facing hump near the tip of the stamen. The anther cells open towards the crest of the ridge, where the flaps are situated back-to-back. Such anther cells have been described as opening "laterally" in the literature, but in order to avoid confusion with laterally situated anther cells (which occur, for instance, in *Pleurothyrium*), I will call this type of opening "back-to-back."

In *M. decurrens* the dorsal ridges are not strongly developed and the anther cells are hardly exserted. In the remaining species the anther cells are clearly exserted.

The most extreme development is found in *M. mahuba*, where the dorsal ridges with the anther cells are exserted as downward curved hooks. The sequence from immersed anther cells to greatly exserted anther cells does not correspond with variation in other characters. In fact, the extremes (*M. pyriflora* with immersed anther cells, *M. mahuba* with greatly exserted anther cells) are very similar in other characters such as leaf shape, leaf size, and type of inflorescence.

In a few species (*M. crassiramea*, *M. lindaviana*, *M. palcazuensis*, *M. sprucei*, *M. subcordata*, and *M. synandra*) the filaments of the stamens are fused in a ring or a short tube. This is a useful character, but because it is hard to recognize, I have not used it in the key. It is most easily seen on young fruits. When the filaments are free, they are visible at the base of the fruit;

when the filaments are united, they are visible as a small cap on top of the fruit.

REPRODUCTIVE BIOLOGY

In a study of the reproductive biology of some neotropical Lauraceae, Kurz (1983) and Kubitzki and Kurz (1984) reported that a *Clinostemon* species here described as *Mezilaurus duckei* showed synchronized dichogamy with a pronounced protogyny.

In this system, two flowering morphs are found. In the A morph, flowers open in the morning and expose the receptive stigmas. During this phase, no pollen is released. Around midday, the stigma wilts and is no longer receptive. The male phase, when the anthers shed the pollen, takes place in the afternoon. An individual flower thus lasts only one day. In the B morph, flowers open in the afternoon, when the stigmas are receptive. Pollen is released during the morning of the following day.

During the fieldwork, Kurz was able to observe only two flowering *Mezilaurus* trees and these turned out to be both A morphs. However, he studied A and B morphs of other Lauraceae species and found that for fertilization, cross-pollination between A and B morphs was necessary. Selfing of A or B morphs did not result in seed set. It is likely that these findings apply to *Mezilaurus* as well.

The *Mezilaurus* flowers observed by Kurz were visited by four species of small (2–3 mm) *Trigona* bees (Meliponinae). *Mezilaurus* flowers are not

known to produce nectar and it is likely that pollen is the only reward for their pollinators.

TAXONOMIC TREATMENT

Mezilaurus Taubert, Bot. Centralbl. 50: 21. 1892.

TYPE: *M. navalium* (Allemão) Taubert.

Silvia Allemão, Dissertatio, Rio de Janeiro. 1848, non Vell. Conc. *Silvaea* Meissner, DC. Prodr. 15: 84. 1864, non Phillipi; *Mezia* Kuntze, Revis. Gen. Pl. 2: 573. 1891, non Schwacke. *Neosilvia* Pax, Natürlichen Pflanzenfamilien, Nachtrag zu Teil II–IV. 1897, nom. superfl.

Clinostemon Kuhlman & Samp., Bol. Mus. Nac. Rio de Janeiro 4(2): 57. 1928. TYPE: *C. mahuba* (Samp.) Kuhlman & Samp.

Shrubs to tall trees, mostly South American, but with one species in Costa Rica. Leaves alternate, usually congested at the apex of the twigs, entire. Petioles often swollen at base. Inflorescences axillary, sometimes seemingly terminal, few- to many-flowered, forming a compound raceme (dibothryum); flowers clustered at the tips of the inflorescence branchlets in several species. Bracts and bracteoles deciduous. Tepals 6, equal or nearly so, small, scalelike, usually erect. Fertile stamens 3, representing the third whorl, 2-celled (in two species 4-celled). Staminodia present or absent. Staminal glands present in one species. Filaments free or connate; anther cells usually extrorse and exserted, situated on a dorsal ridge. Ovary ellipsoid to ovoid, included in the flower tube. Fruit ellipsoid, situated on a small, plate-like cupule.

KEY TO MEZILAURUS

- 1a. Stamens 4-celled; N. Colombia and Costa Rica 2
 - 2a. Inflorescence and pedicels rufous tomentellous; tertiary venation on upper leaf surface immersed; N. Colombia *M. quadrilocellata*
 - 2b. Inflorescence gray strigose; pedicels glabrous or with few basal hairs; tertiary venation on upper leaf surface raised; Costa Rica *M. glaucophylla*
- 1b. Stamens 2-celled; S. America E. of the Andes 3
 - 3a. Leaves gradually narrowed toward base, usually abruptly rounded there, generally large, exceeding 25 cm 4
 - 4a. Flowers sessile; anthers exserted as little hooks; only known from flooded forests in Amazon basin *M. mahuba*
 - 4b. Flowers pedicellate; anthers not hooklike exserted; not occurring in flooded forest 5
 - 5a. Leaves elliptic or slightly obovate, rounded at tip; anthers not exserted at anthesis *M. duckei*
 - 5b. Leaves strongly obovate, acute or acuminate at tip; anthers exserted or not 6
 - 6a. Anthers exserted at anthesis; pedicels 4–8 mm long *M. thoroflora*
 - 6b. Anthers included at anthesis; pedicels 1.5–2 mm long *M. pyriflora*
 - 3b. Leaves decurrent or obtuse at base, generally small, rarely exceeding 20 cm 7
 - 7a. Leaves pubescent below; twigs visibly pubescent 8
 - 8a. Flowers pubescent; shrub or small tree in cerrado vegetation *M. crassiramea*
 - 8b. Flowers glabrous; tree in rain forest *M. lindaviana*
 - 7b. Leaves glabrous below; twigs not visibly pubescent 9
 - 9a. Leaf tip acute (in *M. micrantha* apex is blunt, but present) 10
 - 9b. Leaf tip rounded 12

- 10a. Flowers sessile; Peru *M. palcazuensis*
- 10b. Flowers pedicellate; Brazil or Peru 11
 - 11a. Leaves coriaceous; pedicels ca. 2 mm long *M. micrantha*
 - 11b. Leaves chartaceous; pedicels (5)10–15 mm long *M. sprucei*
 - 12a. Flowers glabrous 13
 - 13a. Flowers sessile; caatinga forests along Rio Negro *M. caatingae*
 - 13b. Flowers pedicellate; rain forests of S. Brazil *M. navalium*
 - 12b. Flowers pubescent 14
 - 14a. Leaf base obtuse or rounded; anther cells (lateral) introrse *M. subcordata*
 - 14b. Leaf base gradually narrowed into petiole; anther cells extrorse 15
 - 15a. Tepals erect; flower tube not constricted at apex; flowers cup-shaped 16
 - 16a. Leaves sessile or nearly so; anthers scarcely exerted at anthesis, the filaments connate *M. decurrens*
 - 16b. Leaves with petioles at least 1 cm long; anthers clearly exerted at anthesis, the filaments free *M. itauba*
 - 15b. Tepals incurved; flower tube constricted at apex; flowers depressed globose 17
 - 17a. Flowers 2 × 2 mm; upper leaf surface shiny and with raised reticulation *M. synandra*
 - 17b. Flowers 1.5 × 1.5 mm; upper leaf surface opaque, the reticulation not raised *M. opaca*

***Mezilaurus caatingae* van der Werff, sp. nov.**

TYPE: Brazil. Amazonas: Rio Negro, São Felipe, caatinga on sandy soil, tree, 15 m, 27 Sept. 1952, *Fróes 28761* (holotype, MO). Figures 1, A & B; 2.

Arbor, 15 m. Ramuli teretes, glabri. Folia coriacea, conferta ad apices ramulorum, glabra, margine involuta, apice rotundata, basi attenuata, obovata, 10–15 × 4–5 cm, super laevia nitidaque, subtus opaca costa elevata nervis lateralibus et venatione immersa. Petioli ca. 1 cm longi. Inflorescentia axillaris, minute adpresse pubescens (basis inflorescentia tantum adest). Flores glabri vel basi leviter minute adpresse pubescentes, obconici, sessiles, conferti ad apices ramulorum inflorescentiae, 2.2 mm longi. Tepala 6, aequalia, erecta, parva (0.2 mm). Stamina 3, per anthesim exserta, 1 mm longa, antheris bilocellatis, extrorsis, lateraliter dehiscentibus. Filamenta libra, pubescentia, antheris aequantia latitudine. Tubus floralis glaber. Ovarium glabrum, globosum, 0.5 mm. Stylus 0.6 mm longus, per anthesim exsertus. Fructus ignoti.

Tree, 15 m. Twigs terete, glabrous. Leaves clustered at the tips of branches, glabrous, coriaceous, obovate, 10–15 × 4–5 cm, the tip rounded, the base gradually narrowed to the short petiole, the margin inrolled, the upper surface smooth, slightly lustrous, the lower surface with a raised midvein; lateral veins (8–12) and reticulation ± immersed; petioles ca. 1 cm, the lamina decurrent as two narrow ridges. Inflorescence axillary, minutely appressed pubescent, paniculately branched, broken on the specimen seen. Flowers glabrous or with some minute pubescence at the base, sessile, clustered at the tips of the inflorescence branchlets, 2.2 mm long, ob-

conic. Tepals 6, very small, 0.2 mm long, equal, erect. Stamens 3, exerted at anthesis, 1 mm long, the anthers 2-celled, extrorse, opening back-to-back; filaments free, as wide as anthers, pubescent. Floral tube glabrous. Ovary globose, glabrous, 0.5 mm. Style slender, 0.6 mm long, exerted at anthesis. Fruit unknown.

In leaf shape *Mezilaurus caatingae* resembles *M. itauba* and *M. decurrens*. The sessile flowers separate it immediately from these species, however. Vegetatively, the recurved leaf margin is diagnostic. This character also occurs in *M. micrantha*, but this species has a bluntly acute leaf apex, never rounded as in *M. caatingae*.

***Mezilaurus crassiramea* (Meissner) Taubert ex Mez, Arbeiten Königl. Bot. Gart. Breslau 1: 112. 1892. *Oreodaphne crassiramea* Meissner, DC. Prodr. 15(1): 117. 1864. *Silvia crassiramea* (Meissner) Mez, Jahrb. Königl. Bot. Gart. Berlin 5: 106. 1889. *Mezia crassiramea* (Meissner) Kuntze, Revis. Gen. Pl. 2: 574. 1891. TYPE: Brazil. Goiás: Serra d'Ourada, *Pohl 1463* (W, K, G-DC, U—this the only specimen seen). Figures 1, C & D; 2.**

Small trees, to 6 m tall. Twigs terete, thick, the older ones with a thick and conspicuous cork layer, the young tips with a dense, light brown tomentum. Leaves clustered at the tips of the twigs, almost sessile (petioles to 3 mm long), ovate or slightly obovate, the tip rounded, the base

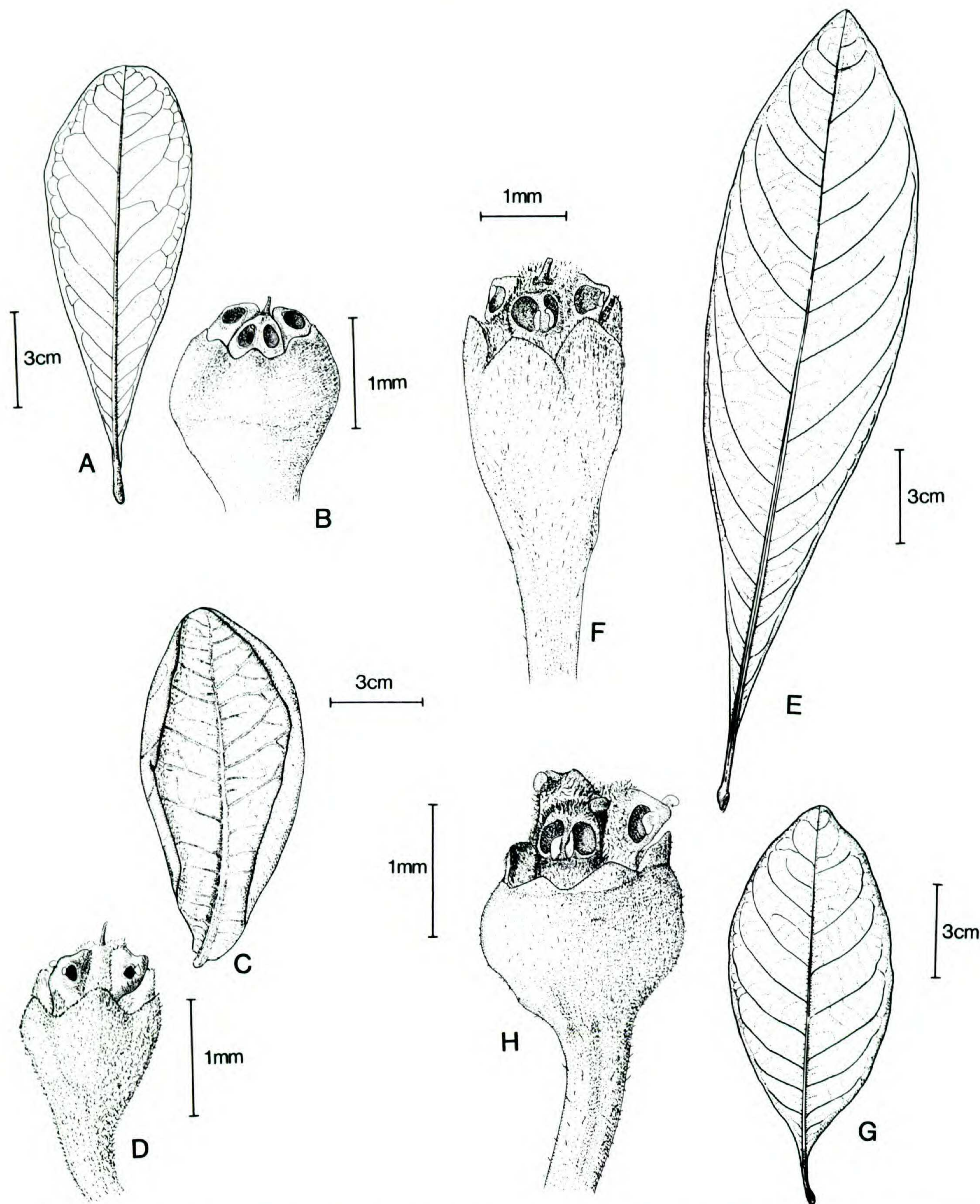


FIGURE 1. A-B. *Mezilaurus caatingae*. —A. Leaf.—B. Flower. C-D. *M. crassiramea*. —C. Leaf.—D. Flower. E-F. *M. decurrens*. —E. Leaf.—F. Flower. G-H. *M. itauba*. —G. Leaf.—H. Flower.

rounded or gradually narrowed and abruptly rounded, with margins frequently recurved, 10 × 5 cm, the upper surface pubescent, but becoming glabrous with age, the lower surface rather dense-

ly pubescent with pale brown hairs; lateral veins 10–15 pairs, leaving the midvein under almost 90°; veins and the final reticulation immersed on upper surface, raised on lower surface. Inflores-



FIGURE 2. Distribution of *Mezilaurus caatingae* (●), *M. crassiramea* (●), *M. decurrens* (▲), and *M. duckei* (■).

cences in the axils of small bracts, seemingly terminal, 7–12 cm long, about as long as leaves, pedicellate, puberulous or with very short pubescence, the flowers arranged spicately along the lateral branchlets; branchlets and flowers subtended by puberulous, ovate bracts, these ca. 0.1 mm long, the flowers brown puberulous, ca. 2 mm long; pedicel ca. 2 mm. Tepals 6, equal, ca. 0.8 mm long, erect, ovate. Stamens 3, exserted; anthers 2-celled, the cells small, on dorsal ridge of anthers, opening back-to-back; filaments fused into a tube. Ovary ovoid, ca. 1 mm, the style

gradually narrowed, ca. 1 mm, exserted beyond anthers. Staminal glands and staminodia lacking. Young fruit globose, 6 mm diam., seated on swollen pedicel, the tepals persisting.

Vernacular name. *Cumbuquinha* (fide Ratter).

Additional specimens examined. BRAZIL. GOIÁS: Serra Dourada, *Anderson 10003* (F, NY, MO, US). MATO GROSSO: 7 km SW of Xavantina, *Ratter et al. 805* (MO); ca. 270 km N of Xavantina, *Ratter 1293* (MO).

Mezilaurus crassiramea is a well-defined species known from a few collections in cerrado vegetation. Diagnostic characters are the thick corky twigs, the pubescent leaves, and puberulous flowers. It can, as many cerrado species, withstand fire; the Ratter collections come from trees with charred or fire-blackened trunks.

***Mezilaurus decurrens* (Ducke) Kosterm.**, Med. ed. Bot. Mus. Herb. Rijks Univ. Utrecht 25: 40. 1936. *Silvia decurrens* Ducke, Trop. Woods 42: 19. 1935. TYPE: Brazil. Amazonas: Rio Negro, mouth of Rio Curicuriary, non-inundated forest. *Ducke RB 23669* = *Yale No. 20999* (lectotype, RB, not seen; isotype F, fragm. U). Figures 1, E & F; 2.

Large tree. Twigs minutely puberulous toward apex, the terminal bud with yellowish, appressed pubescence. Leaves clustered at the tips of branches, glabrous on both surfaces, elliptic or narrowly elliptic, 15–25 × 5–7.5 cm, the tip rounded, the base gradually decurrent onto the petiole, this 1–2 cm long; laminae coriaceous, opaque, the reticulation not raised, rather lax. Lateral veins not strongly developed, 7–12 pairs, immersed above, slightly raised below. Midrib thick, dark, raised above, more conspicuously so on lower surface. Inflorescences axillary, subterminal, pyramidal, 10–18 cm long (fide Kostermans), appressed pilose. Flowers subglobose or obconical, ca. 2–2.5 mm long, 2 mm wide, appressed pubescent. Tepals 6, equal, erect, triangular, wider than long. Fertile stamens 3, 2-celled, 1–1.5 mm long, slightly exserted, pubescent; filaments connate, wider than anthers; anther cells extrorse, opening back-to-back. Ovary subglobose, densely pubescent (except base), ca. 1 mm long, the style slender and briefly exserted. Fruit unknown.

Mezilaurus decurrens is rare and known to me with certainty only from the type collection. At first glance it appears quite similar to *M. itauba*, but differs in several subtle characters. The leaves of *Mezilaurus decurrens* do not have the raised reticulation and minute gland dots of *M. itauba*, and their leaf bases taper more gradually into the petioles. Better differences are found in the flowers: in *M. decurrens* the anthers are scarcely exserted and the filaments are connate, whereas in *M. itauba* the anthers are greatly exserted and the filaments free.

A few collections that I place in *Mezilaurus*

itauba are close to *M. decurrens* in leaf outline (*Ducke 681, Foldats 3613*), but I attach more diagnostic value to the raised reticulation and the greatly exserted anthers.

***Mezilaurus duckei* van der Werff, sp. nov.** TYPE: Brazil. Amazonas: Reserva Florestal Ducke, *Aleusio 98* (holotype, US). Figures 2, 3.

Arbor, 20 m alta. Ramuli crassi, cicatibus conspicuis foliorum delapsorum notati, apicibus dense minuteque puberulis, glabrecentibus. Gemmam terminalem non vidi. Folia conferta ad apices ramulorum, chartacea, elliptica vel leviter obovata, apice rotundata, basi abrupte angustata, 30 × 10 cm, glabra praeter costam et nervos secundarios puberulos. Costa et nervii secundarii super immersi, subtus elevati. Reticulatio super obscura, subtus elevata. Petioli crassi, ca. 1 cm longi, dense minuteque puberuli. Inflorescentiae axillares, subterminales, 20–25 cm longae, minute puberulae, anguste pyramidales, bractis bracteolisque persistentibus et puberulis. Flores spicatum secus ramulos inflorescentiae dispositi, frequenter reflexi, turbinati, ca. 1 mm longi. Pedicelli ca. 2 mm longi, glabri vel pubescentia laxa ad basim. Tepala 6, aequalia, erecta, ca. 0.3 mm longa. Stamina fertilia 3, ca. 0.5 mm longa, filamentis pubescentibus, liberis, latoribus quam antheris glabris 2-locellatisque. Staminodia 6, parva, ca. 0.2 mm longa. Ovarium conicum, glabrum, ca. 0.4 mm longum, stylo ca. 0.7 mm longo. Fructus ignoti.

Tree, 20 m. Twigs thick, 1 cm diam. 5 cm below the tip, with conspicuous leaf scars, the tip very finely brown tomentellous. Leaves clustered at the tips of branches, slightly obovate, 25–30 × 8–10 cm, the tip rounded, gradually narrowed toward the base, the base abruptly narrowed; upper surface glabrous, opaque, venation immersed, the tertiary venation scarcely visible; lower surface minutely puberulous when young, glabrescent with age, the indument persisting on the main veins, 10–12 pairs of lateral veins, the secondary and tertiary venation raised, the midrib strongly raised and thick; petioles 0.5 cm thick, ca. 1 cm long, minutely puberulous. Inflorescences axillary, ca. 20–25 cm long, paniculately branched, the branchlets 3–4 cm long, the upper ones slightly shorter than the lower ones, minutely brown puberulous. Bracts and bractlets pilose, persisting at anthesis, the bracts 1.5 mm long, bractlets ca. 0.7 mm long. Flowers pedicellate, pedicels ca. 2 mm long, glabrous. Flowers glabrous, cup-shaped, 1 mm long, tepals 6, small, 0.3 mm long, erect. Fertile stamens 3, ca. 0.5 mm long, the filaments free, pubescent, wider than the glabrous, 2-celled anthers. Staminodia 6, ca. 0.2 mm long. Ovary conical, glabrous, ca. 0.4 mm long, the style ca. 0.7 mm long. Fruit unknown.

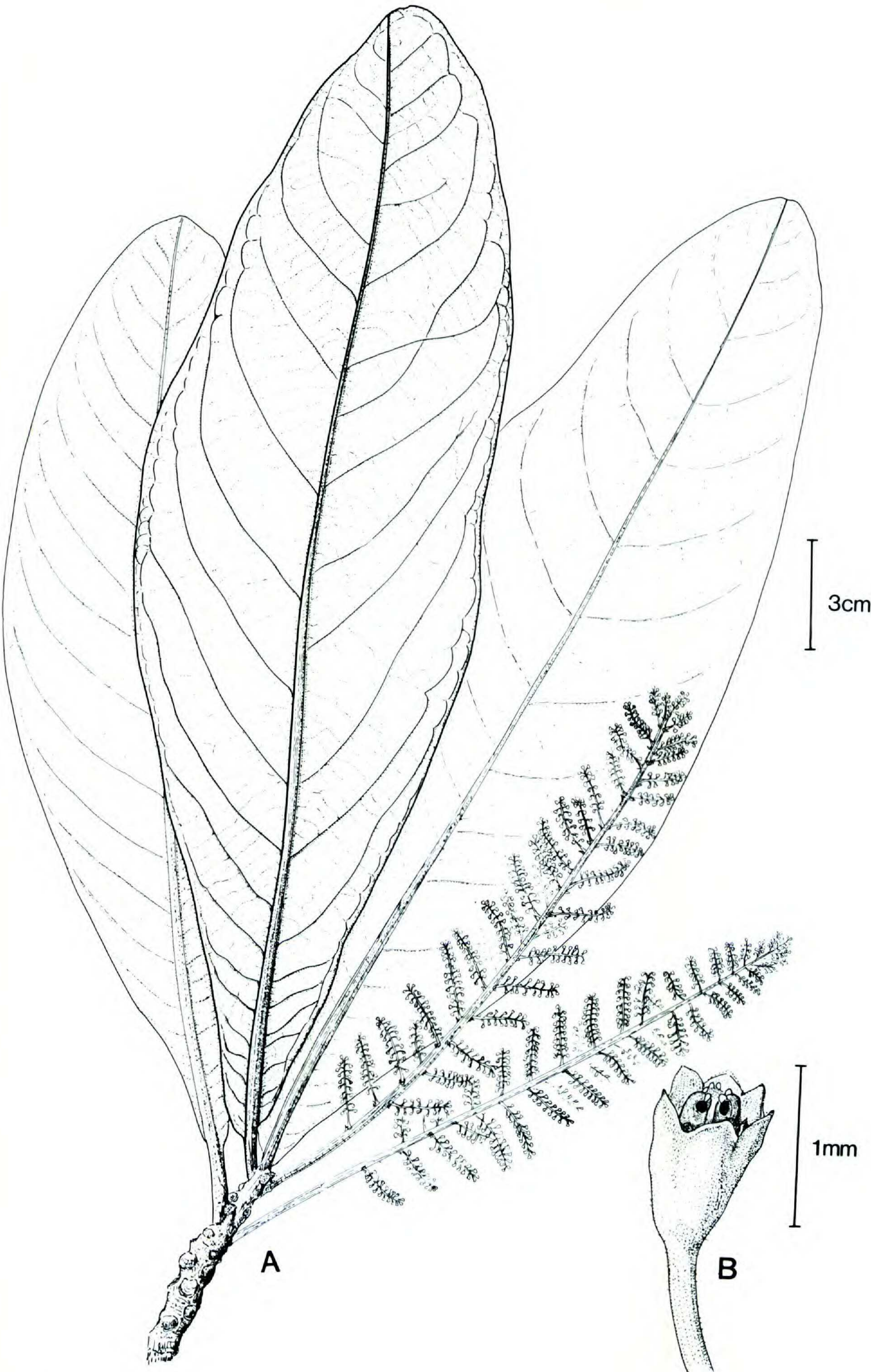


FIGURE 3. *Mezilaurus duckei*.—A. Habit.—B. Flower.

Common name. *Itauba abacate*.

Paratype. BRAZIL. AMAZONAS: Reserva Florestal Ducke, tree nr. 116, *Rodrigues 8203* (NY).

This species is named after Adolpho Ducke, an outstanding botanist and collector who made numerous excellent collections of Lauraceae in Amazonian Brazil. It is fitting that this new species is only known from the forest reserve dedicated to Ducke.

***Mezilaurus glaucophylla* van der Werff, sp. nov.**

TYPE: Costa Rica. Prov. San José: Zapatón de Puriscal, tree, 9 m, *Zamora & Poveda 1014* (holotype, MO; isotypes, F, CR). Figure 4.

Arbor, 20 m. Ramuli teretes, cicatris insignibus foliorum muniti, minute pubescentes; gemma terminalis adpresse leuco-pubescent; cortex ramulorum venterum lenis desquamansque. Petioli inflatis fundis, leviter canaliculati vel triangulares, cinereo-pubescentes, ad 6 cm longi. Folia ad apices ramulorum conferta, obovata, chartacea, subtus glauca, apicibus basibusque obtusis vel acutis, super costis et nervis immersis, venatione leviter elevata, praeter puberulas costas glabra; subtus costis nervisque elevatis, venatione leviter elevata; nervi 10–14-jugi; laminae subtus parce minuteque puberulae. Inflorescentiae ad 15 cm longae, axillares, pyramidatae, cinereo-strigosae. Pedicelli ad 1.5 mm longi, glabri vel basim aliquot pilis. Flores glabri, cupuliformes, in sicco ca. 1 mm longi et lati. Tepala 6, per anthesin erecta vel paullo incurvata; inaequalia, 3 exteriora interioribus breviora, late deltoidea. Stamina 3, 4-locellata, filamentis latitudine antheris aequantibus, ca. 1 mm longa, ca. 0.7 mm lata, tepalis exterioribus opposita. Staminodia 3, ca. 0.5 mm longa, strigosa, lanceolata, tepalis interioribus opposita. Tubus floralis vadosus, intus glaber. Ovarium glabrum, ellipsoideum, sensim in stylo attenuatum, ovarium stylusque ca. 1 mm longus. Fructus ignotus.

Tree, to 20 m tall. Twigs terete, with conspicuous leaf scars, minutely pubescent, the terminal bud white appressed pubescent; bark on older twigs soft and flaking. Leaves clustered at the tips of the branches, alternate, obovate, chartaceous, glaucous and laxly and minutely puberulous below, the tip rounded or acute, the base obtuse or acute, 15–25 × 8–12 cm, the midrib and lateral veins immersed, but the tertiary venation slightly raised above, glabrous except for the puberulous midrib; midrib and lateral vein raised below, the tertiary venation much less so; lateral veins 10–14 pairs; petioles with swollen bases, shallowly canaliculate to triangular in cross section, grayish puberulent, to 6 cm long. Inflorescences axillary, pyramidal, to 15 cm long, gray strigose. Pedicels ca. 1.5 mm long, glabrous

or with few gray, appressed hairs at the base, subtended by 2 small, deltoid, strigose bracts, ca. 0.2 mm long. Flowers glabrous, more or less cup-shaped, ca. 1 mm long and wide when dry. Tepals 6, at anthesis more or less erect, the outer three smaller than the inner three, broadly deltoid. Stamens 3, all 4-celled, the filaments as wide as the anthers; glabrous or with a few hairs at the base, ca. 1 mm long, 0.7 mm wide, situated opposite the outer tepals; tips of the stamens curved inward; anther cells positioned on the upper part. Inner tepals pushed apart at anthesis and exposing anther cells in their sinuses. Staminodia 3, alternating with stamens, lanceolate, strigose, ca. 0.5 mm long. Ovary glabrous, ellipsoid, gradually narrowed into style, ovary and style ca. 1 mm long. Floral tube shallow, glabrous inside. Fruit unknown.

Paratypes. COSTA RICA. PUNTARENAS: Osa Peninsula, in forest W. of Rincón, *Hammel et al. 15214* (MO; duplicates to be distributed).

There is no doubt that *Mezilaurus glaucophylla* and *M. quadrilocellata* are closely related. They differ from the other *Mezilaurus* species in the following characters: distribution (the only species north of the Andes); presence of four-celled anthers; leaves more or less glaucous below; unequal tepals; and the inflorescence not strictly a dibothryum, but sometimes with short tertiary axes. These two species could be regarded as forming a new genus, based on their four-celled stamens and unequal tepals, but it should be mentioned that several other *Mezilaurus* species have small tepals that one cannot very well judge to be equal or not. If additional differences separating *M. glaucophylla* and *M. quadrilocellata* from the other *Mezilaurus* species are found (in cupule shape, for instance), it might be better to treat them as a separate genus, but for the time being, I prefer to include them in *Mezilaurus*.

In addition to the differences mentioned in Table 1, the few available collections also suggest that *Mezilaurus glaucophylla* has larger, thinner leaves and larger inflorescences than *M. quadrilocellata*.

***Mezilaurus itauba* (Meissner) Taubert ex Mez,** Arbeiten Königl. Bot. Gart. Breslau 1: 112. 1892. *Acrodiclidium itauba* Meissner, DC. Prodr. 15(1): 86. 1864. *Endiandra itauba* (Meissner) Benth. & Hook., Gen. Pl. 3: 154. 1880. *Silvia itauba* (Meissner) Pax, Natürlichen Pflanzenfamilien 3(2): 123. 1889.

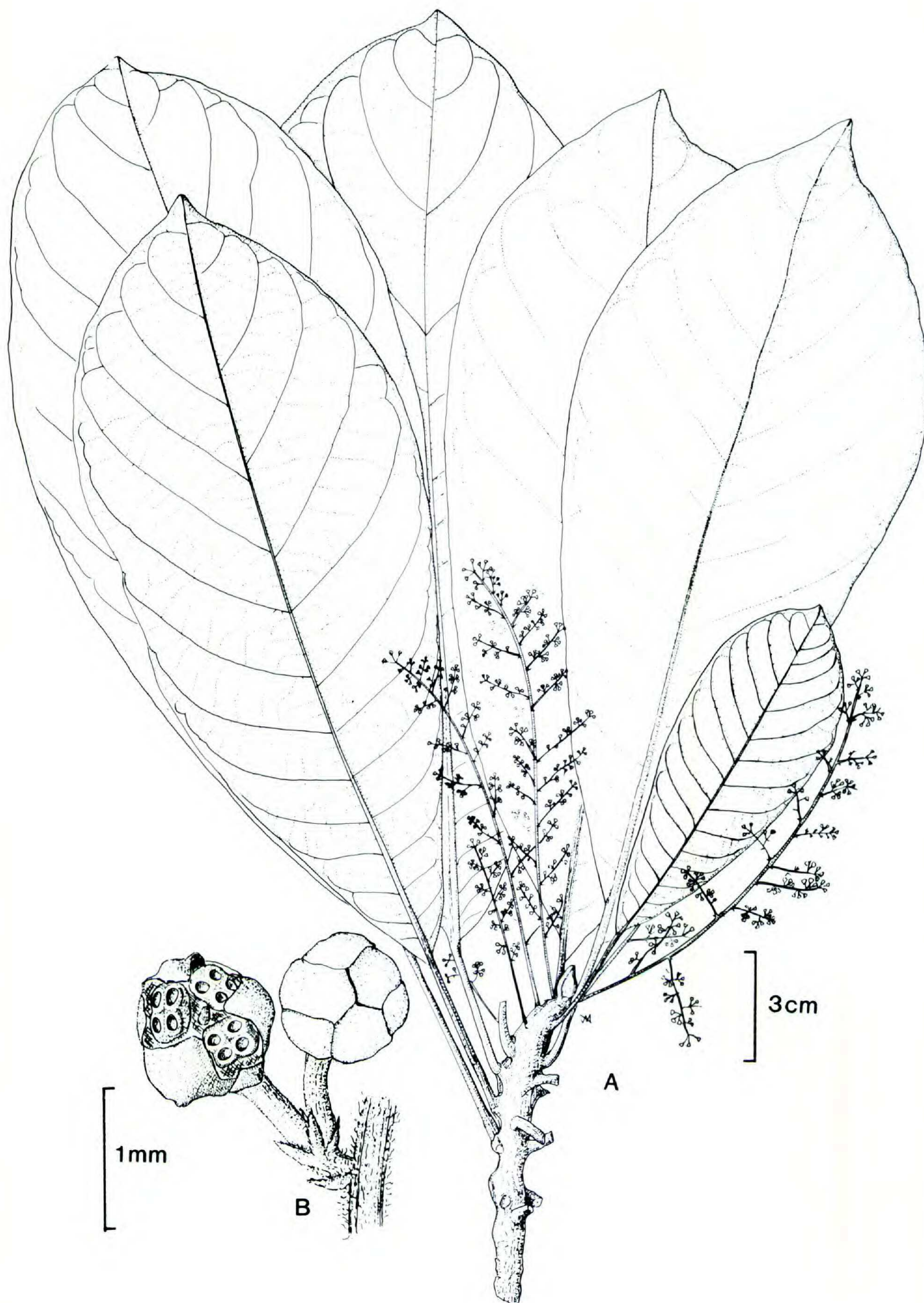


FIGURE 4. *Mezilaurus glaucophylla*.—A. Habit.—B. Flower and bud seen from above.

Mezia itauba (Meissner) Kuntze, Rev. Gen. Pl. 2: 574. 1891. TYPE: Brazil. Pará: Santarem, Spruce 643 (lectotype, K, fide Kostermans, BM, C, fragm. F). Figures 1, G & H; 5.

Acrodiclidium itauba Meissner var. *amarella* Meissner, DC. Prodr. 15(1): 86. 1864. TYPE: Brazil. Pará: Santarem, Spruce 646 (lectotype not chosen, BM, C).

Oreodaphne hookeriana Meissner, DC. Prodr. 15(1):

TABLE 1. Comparison of *Mezilaurus glaucophylla* with *M. quadrilocellata*.

	<i>M. glaucophylla</i>	<i>M. quadrilocellata</i>
Inflorescence	gray strigose	rufous tomentellous
Pedicels	few basal hairs, otherwise glabrous	rufous tomentellous
Tertiary venation on upper leaf surface	raised	immersed
Terminal bud	densely gray pubescent	brown tomentellous

131. 1864. TYPE: Brazil. Pará: Santarem, *Spruce* 669 (not seen.)
Mezilaurus anacardioides (Meissner) Taubert ex Mez, Arb. Bot. Garten Breslau 1: 112. 1892. *Acroclidium anacardioides* Meissner, DC. Prodr. 15(1): 86. 1864. *Misanteca anacardioides* (Meissner) Benth. & Hook., Gen. Pl. 3(2): 155. 1880. *Silvia anacardioides* (Meissner) Mez, Jahrb. Bot. Gart. Berlin 5: 108. 1889. *Mezia anacardioides* (Meissner) Kuntze, Revis. Gen. Pl. 2: 574. 1891. TYPE: Venezuela. Amazonas: San Carlos de Río Negro, *Spruce* 2961 (lectotype not chosen, BM, G).
Silvia polyantha Mez, Bull. Herb. Boiss. 2^e sér. V: 233. 1905. TYPE: Brazil. Amazonas: Moura, Rio Negro, *Ule* 6055 (holotype, B, not seen, isotype, G).
Silvia rondonii Mez et Hoehne, Bot. Archiv VI: 230. 1924. TYPE: Brazil. Mato Grosso: near Tres Buritis, *Kuhlmann* 1976 (K, not seen).

Large trees to 35 m tall, rarely shrubs. Twigs terete, glabrous or nearly so, the terminal bud appressed pubescent, the bark rather thin and flaking. Leaves clustered at the tips of branches, firmly chartaceous or coriaceous, glabrous at maturity, elliptic or slightly obovate, ca. 15 × 5 cm, the base gradually narrowed into petioles, the tip rounded, the reticulation on both surfaces slightly raised, the midrib and lateral veins (7–12 pairs) immersed above, raised on lower surface, the lateral veins arching upward and fading near the margin. Lower leaf surface densely and minutely gland dotted; petioles glabrous, with swollen bases, 1–2.5 cm long. Inflorescences axillary, subterminal, narrowly pyramidal, 5–10 cm long, laxly appressed pubescent. Flowers subumbellately arranged at tips of lateral branchlets, laxly and minutely appressed pubescent. Pedicels minutely appressed pubescent, 2–4 mm long. Bracts and bractlets deciduous. Flowers hemispherical, 1.5–2 mm long, the 6 equal tepals erect (rarely spreading), wider than long, the anthers exserted. Fertile stamens 3, 2-celled, ovate-elliptical, ca. 1–1.2 mm long, the filaments free, pubescent, the anther cells glabrous, situated on a dorsal ridge, the cells large, opening back-to-back. Ovary ellipsoid, pubescent, the style exserted. Flower tube pubescent. Staminal glands and staminodia lacking. Fruit an ellipsoid berry, ca. 2 × 1 cm, subtended by a small, platelike cupule.

Selected additional specimens examined. SURINAM. Boschreservaat, sectio O, tree No. 760, *Boschwezen* 3088 (NY). BRAZIL. PARÁ: Rio Tapajos, Villa Braga, *Ducke* RB 17537 (G, US). PARÁ: Serra dos Carajas, *M. G. Silva* 2909 (MO); Rio Jari, Monte Dourado, *N. T. Silva* 1041 (NY). PERU. MADRE DE DIOS: Tahuamanú, *Diaz* 17 53-96 (MO). BOLIVIA: San Francisco, 50 km from Pto. Rica Pando, *E. Menesk* 626 (MO).

Mezilaurus itauba is the most frequently collected and widest ranging species of the genus. In addition to the countries listed, it has been reported from French Guiana, based on a Mélinon collection I have not seen. Although there is some variation in degree of pubescence and leaf shape throughout its range, *M. itauba* is adequately characterized by free staminal filaments, pubescent flowers, and glabrous leaves rounded at the tip and gradually narrowed basally. The anthers, with large cells, are also long exserted for their size. The numerous gland dots on the lower leaf surface are best seen on rather young leaves; on mature, more coriaceous leaves they are often scarcely visible.

Alencar 55 (MO) is included in *M. itauba* with hesitation; it differs somewhat in leaf shape, but in the absence of floral differences I regard it as *M. itauba*. However, when more collections are available, it might turn out to be a new species.

The wood of *Mezilaurus itauba* is hard and much used for construction. Mez (1889) reported that the berries are edible.

Mezilaurus lindaviana Schwacke et Mez, Arb. Bot. Garten Breslau 1: 112. 1892. TYPE: Brazil. Amazonas: Rio Branco, *Schwacke* 7080 (lectotype, chosen by Kostermans, B, not seen). Figures 6, A & B; 7.

Misanteca duckei Samp., Comissão Linhas Telegr. Estrat. Matto Grosso Amazonas, Publ. 56 (Anexo 5, Bot. Part X): 15. 1917. *Silvia duckei* (Samp.) Samp., Bol. Mus. Nac. Rio de Janeiro 4: 39. 1928. TYPE: Brazil. Amazonas: Montealegra, *Ducke* RB 17540 = *MG* 16032, not seen.

Mezilaurus wurdackiana C. K. Allen, Mem. New York Bot. Garden 10: 56. 1963. TYPE: Venezuela. Bolívar: Hato La Vergareña, *Wurdack & Guppy* 91 (holotype, NY, isotype, US).



FIGURE 5. Distribution of *Mezilaurus itauba*.

Tree, to 25 m. Twigs thick, round, with a rather thick corky layer, the tips with brown velutinous pubescence. Leaves alternate, clustered at the tips of the branches, chartaceous or coriaceous, obovate, $8-17 \times 4-8$ cm, the tip rounded or very shortly acute, the base cuneate or abruptly rounded; young leaves hirsute, becoming glabrous above (except on midrib and primary veins) at maturity; venation impressed above, the midrib, secondary and tertiary venation raised below; secondary veins about 10 pairs; petioles short, thick, brown-tomentose, 5–8 mm long. In-

florescences axillary, mostly subterminal on branches, pyramidal, tomentellous, about as long as the leaves; branchlets patent, 1–3 cm long, the flowers spicately arranged and often somewhat recurved. Flowers white or yellow-green, fragrant, glabrous, 1.2 mm long. Tepals 6, equal, triangular, ca. 0.2 mm long, 0.4 mm wide. Fertile stamens 3, 1 mm long; filaments (ca. 0.5 mm) connate, narrower than anthers, pubescent; anthers shortly exserted, 2-celled, 0.5 mm long, the cells situated on a dorsal ridge, opening back-to-back. Ovary ellipsoid, 0.8 mm long, with slender

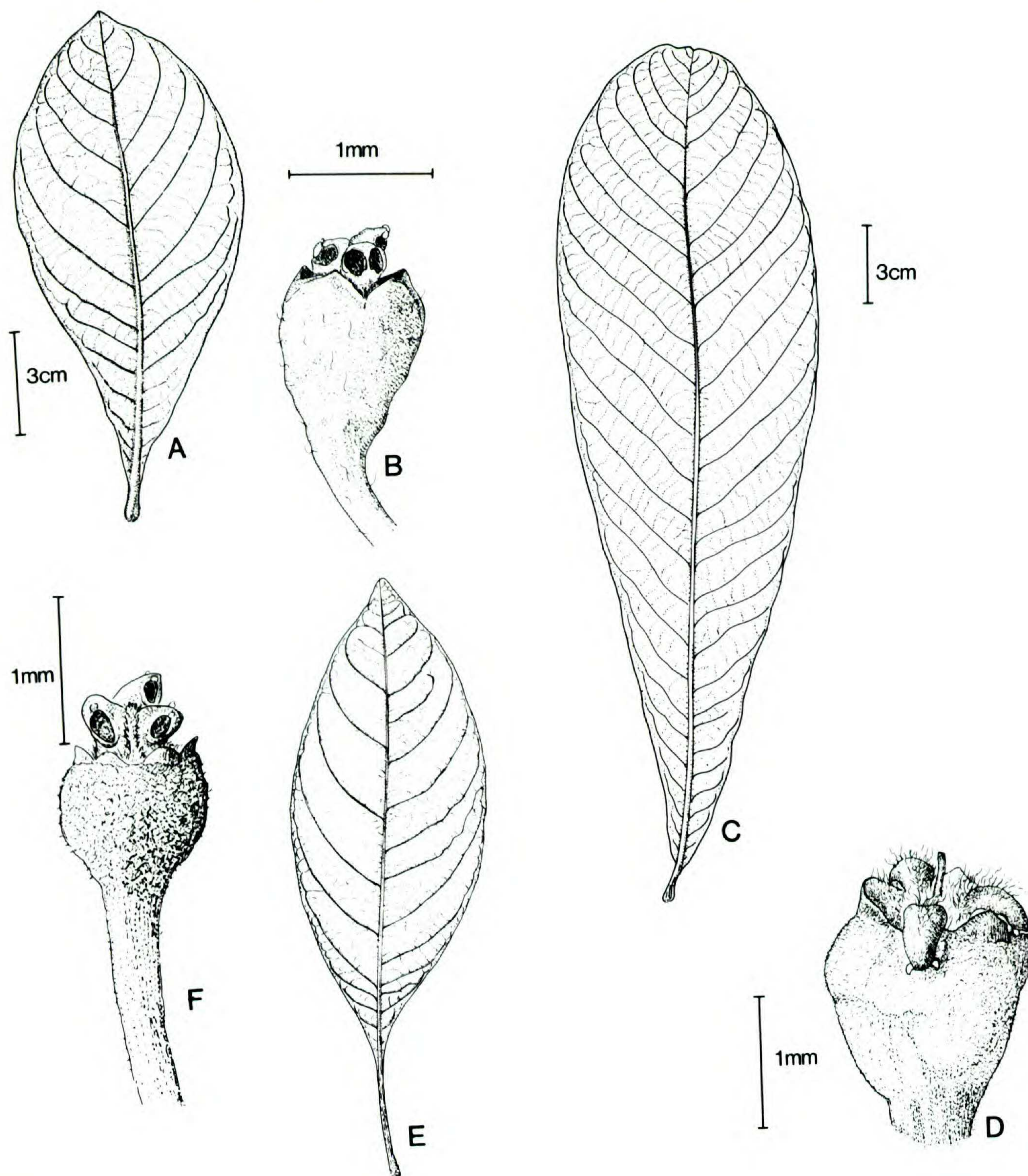


FIGURE 6. A–B. *Mezilaurus lindaviana*. —A. Leaf. —B. Flower. C–D. *M. mahuba*. —C. Leaf. —D. Flower. E–F. *M. micrantha*. —E. Leaf. —F. Flower.

style exceeding the anthers. Stamens without basal glands. Staminodia lacking. Fruit ellipsoid, 2×1.2 cm, subtended by a small platelike cupule (ca. 3 mm diam.).

Selected additional specimens examined. GUYANA: Kanuku Mountains, *For. Dept. Brit. Guyana* 5804 (NY), same location, *Smith* 3208 (F, MO, US). BRAZIL. AMAZONAS: Rio Branco, Boa Vista, *Ducke* 1336 (F, NY, US). AMAPÁ: surrounding of Macapa, *Frões & Black* 27453 (NY). PARÁ: Planalto de Santarem, *Frões* 30976

(NY, US); Rio Jarí, Monte Dourado, *E. Oliveira* 4749 (NY), same location, *N. T. Silva* 996 (NY, US).

Mezilaurus lindaviana is somewhat variable in leaf shape but is clearly characterized by the combination of pubescent leaves and glabrous flowers. *Mezilaurus crassiramea*, a similar species with pubescent leaves, has pubescent flowers and is known only as a shrub or a small tree in cerrado vegetation.



FIGURE 7. Distribution of *Mezilaurus lindaviana* (●), *M. mahuba* (▲), and *M. micrantha* (■).

Silva 2403 (NY, 2 sheets, MO) is included in *M. lindaviana* as an aberrant collection; it differs from other collections of that species in having sparse appressed pubescence. Other characters (leaf shape, size, flowers) point to *M. lindaviana* and I feel that a single collection with unusual pubescence need not be given taxonomic status.

Kostermans (1938) cited as type of *M. lindaviana* Schwacke 7080 = Glaziou 19798 and gave Serra d'Antonio Pereira in Minas Gerais as the type locality. Schwacke and Mez (Mez, 1892) cited only Schwacke 7080 as type collection and

gave as type locality "in campis ad Rio Branco." It is likely that Glaziou distributed duplicates of the Schwacke collection under his own name with incorrect locality data, as he did with other collections (Wurdack, 1970). Therefore, I ignore the reference of *M. lindaviana* as occurring in Minas Gerais, as cited by Glaziou (1905–1913) and Kostermans (1938).

Mezilaurus mahuba (Samp.) van der Werff, comb. nov. Basionym: *Acrodiclidium mahuba* Samp., Comissão Linhas Telegr. Estrat.

Matto Grosso Amazonas, Publ. 56 (Annexo 5, Bot. Parte X): 14. 1917. *Clinostemon mahuba* (Samp.) Kuhl. & Samp., Bol. Mus. Nac. Rio de Jan. 4(2): 57. 1928. *Licaria mahuba* (Samp.) Kosterm., Rec. Trav. Bot. Neérl. 35: 123. 1938. *Misanteca mahuba* (Samp.) Lundell, Wrightia 4: 100. 1969. TYPE: Brazil. Pará: Gurupa, Varzea do Rio Amazonas, *Ducke MG 16538* = *RB 17582* (isotype, U). Figures 6, C & D; 7.

Large trees. Twigs thick, glabrescent, with dense brown tomentum when young. Leaves large, 20–40 × 12–15 cm, obovate, clustered at the tips of branches, glabrous above with the exception of the puberulous midrib, softly pubescent below, the apex rounded, the base cuneate; venation immersed on upper surface; midrib, lateral veins (15–23 pairs) and tertiary venation raised below; petioles thick, 5 mm diam., 2–3 cm long, densely and minutely tomentose. Inflorescences subterminal, densely puberulous, large (20–35 cm long), the flowers arranged in clusters on the lateral branches. Flowers sessile, brown-puberulous, more or less globose, ca. 1.8 mm long. Tepals 6, minute, incurved. Fertile stamens 3, all 2-celled; filaments densely strigose, with 2 glands attached a little above the base; anthers glabrous, strongly curved outside the flower tube. Staminodes 9, ca. 0.5 mm long, lanceolate, strigose. Ovary glabrous, globose, ca. 0.5 mm long, the style ca. 1 mm long, curved at the tip. Fruit ellipsoid, 3.5 cm long, seated on a small, glabrous disk.

Additional specimens examined. BRAZIL. AMAPÁ: Rio Juruxi-Mazagão, *B. V. Rabelo 2715* (MO). PARÁ: Belem, *Ducke RB 17583* (U, US), *Ducke 1234* (NY, MO, US); Trapiche Hypolito, *Krukoff 5870* (BR, NY, MO); Ilha de Pará, *Mori et al. 16510* (MO); Belem, *Murça Pires 1488* (NY).

Mezilaurus mahuba is very distinctive because of its peculiar anthers. When sterile, it is rather similar to *M. thoroflora*. The latter, however, has shorter petioles and a fine and closely appressed pubescence on young twigs and leaves, whereas in *M. mahuba* the petioles are longer and the pubescence consists of spreading hairs. *Mezilaurus mahuba* is a species known only from seasonally inundated forest in the states of Pará and Amapá.

The few available collections of *Mezilaurus mahuba* clearly show two phases in the floral development, probably corresponding with the male and female phase as described by Kubitzki and Kurz (1984) for several other species of Lau-

raceae. The three sheets of *Krukoff 5870* all have flowers with the anthers recurved and tightly pressed against the flower, almost hiding the anther cells (female phase), while the three sheets of *Ducke 1234* have only flowers with the anthers spreading and free of the flower, fully exposing the anther cells (male phase). The inflorescences of these specimens are large, and it is interesting that the flowers on an inflorescence all appeared to be in the same phase of development, quite unlike what I have seen in species of *Ocotea* and *Nectandra* with large inflorescences.

***Mezilaurus micrantha* van der Werff, sp. nov.**

TYPE: Brazil. Amazonas: Manáos, Reserva Florestal Ducke, *Rodrigues & Coelho 7555* (holotype, NY). Figures 6, E & F; 7.

Arbor, 20 m alta. Ramuli teretes, glabri vel prope apicem adpresse pubescentes; gemma terminalis sericea. Folia conferta ad apices ramulorum, coriacea, adulta glabra, juvenalia adpresse pubescentia, elliptica, 10–15 × 3.5–5 cm (sine petiolo), basi attenuata, apice acuta acumine obtuso, marginibus revolutis, in sicco atra. Venatio super immersa, subtus costa et nervi laterales (5–8) elevati. Petioli ad 2 cm longi, juvenales adpresse pubescentes, adulti glabri. Inflorescentiae axillares, subterminales, ad 5 cm longae, paniculatae, leviter adpresse pubescentes. Flores parvi, 1–1.1 mm longi, fasciculati ad apices ramulorum inflorescentiarum, cyathiformes, leviter adpresse pubescentes. Pedicelli ad 2 mm longi, leviter adpresse pubescentes. Bractee bracteolaeque deciduae. Tepala 6, aequalia, triangularia, erecta vel leviter patentia. Stamina 3, ca. 0.6 mm longa, per anthesin 0.3 mm exserta, filamentis liberis, dense pubescentibus. Antherae 2-locellatae, locellis extrorsis, latere ventrali staminis omnino pubescenti. Ovarium glabrum, sensim in stylo attenuatum, ovarium stylusque 1 mm longus. Fructus ignoti.

Tree, 20 m tall. Twigs terete, glabrous or, near the apex, with some appressed pubescence, the terminal bud sericeous; the bark rather thick. Leaves clustered at the tips of the branches, coriaceous, drying blackish, glabrous at maturity, but when young with some appressed pubescence, elliptic, ca. 10–15 × 3.5–5 cm (exclusive of petiole), the base gradually narrowed attenuately into the petiole, the tip blunt but not rounded, the margins revolute; veins and reticulation not or scarcely raised on upper surface; midvein and main lateral veins (5–8 pairs) raised on lower surface, but reticulation not obvious. Petioles to 2 cm long, glabrous at maturity. Inflorescences axillary, subterminal, to 5 cm long, pyramidal, with some appressed pubescence. Flowers arranged subumbellately at the ends of the lateral branches, appressed pubescent. Ped-

icels minutely appressed pubescent, ca. 2 mm long at anthesis. Bracts and bractlets deciduous. Flowers cup-shaped, 1–1.1 mm long. Tepals 6, equal, triangular, erect. Stamens 3, 0.6 mm long, exerted 0.3 mm at anthesis, the filaments free, densely pubescent; anthers 2-celled, glabrous, the cells extrorse, opening back-to-back; ventral side of the anther entirely pubescent. Floral tube pubescent. Staminal glands and staminodia lacking. Ovary glabrous, gradually narrowed into style, the ovary and style ca. 1 mm long, the style exerted at anthesis. Fruit unknown.

Paratypes. BRAZIL. AMAZONAS: Manáos, Reserva Florestal Ducke, *W. Rodrigues* 8190 (NY); AM-1, Km 74, *W. Rodrigues* 7066 (NY).

Mezilaurus micrantha is rather similar to *M. itauba*; it differs in having smaller flowers, blunt but not rounded leaf tips, lack of gland dots on the leaves, slightly revolute leaf margins, and nearly black dried leaves. These characters are not strong individually, but taken together they allow identification of flowering as well as sterile collections. The flowers of this species are among the smallest I have seen in the genus, hence its specific epithet.

Mezilaurus navalium (Allemão) Taubert ex Mez, *Arbeiten Königl. Bot. Gart. Breslau* 1: 112. 1892. *Silvia navalium* Allemão, *Dissertatio*, Rio de Janeiro. 1848. *Silvaea navalium* (Allemão) Meissner, DC. *Prodr.* 15(1): 84. 1864. *Endiandra navalium* (Allemão) Benth. & Hook., *Gen. Pl.* 3: 154. 1880. *Mezia navalium* (Allemão) Kuntze, *Revis. Gen. Pl.* 2: 574. 1891. TYPE: Brazil, Rio de Janeiro, *Allemão*, *s.n.* (holotype, R, not seen). Figures 8, A & B, 9.

Tall trees, to 25 m. Branches terete, glabrous, the tips with appressed, short hairs, the terminal bud densely gray strigose. Leaves clustered at branch tips, narrowly elliptic, 10–12 × 3–3.5 cm, somewhat coriaceous, glabrous on both surfaces or with few appressed hairs along the midrib, the tip rounded, the base sharply acute, lateral veins not strongly developed, 10–15 pairs, the upper surface dull, smooth, lower surface with slightly elevated reticulation; petioles ca. 1 cm long. Inflorescences axillary, glabrous or with few scattered hairs, 3–5 cm long, the flowers clustered at the ends of the lateral branches. Flowers glabrous, ca. 2 mm long. Pedicels 2–3 mm long, glabrous. Bracts deciduous. Tepals 6, equal, erect,

scalelike, ca. 0.3 mm long. Stamens 3, ca. 1.5 mm long; filaments free, strigose; anthers exerted, glabrous, the 2 large cells positioned on a dorsal ridge, opening back-to-back, slightly divergent, exposing the exerted stigma. Ovary ellipsoid, glabrous, ca. 2 mm long, including the exerted stigma. Staminal glands and staminodia lacking. Immature fruits subtended by the small tepals, occasionally the stamens visible at the base of the young fruit.

Additional specimens examined. BRAZIL. RIO DE JANEIRO: Theresopolis, *Glaziou* 11470 (C, G, U), *Glaziou* 11473 (C); Petropolis, *Glaziou* 12124 (C, G), *Glaziou* 12125 (C, G, MO, U, US).

Mezilaurus navalium is the only *Mezilaurus* species known from the Atlantic rain forests in southern Brazil. The wood is hard and much used for naval construction. Diagnostic characters, in addition to its distribution, are the glabrous flowers and leaves with rounded or blunt apices.

Mezilaurus opaca Kubitzki & van der Werff, sp. nov. TYPE: Peru. Depto. Loreto: Prov. Requena, Distr. Jenaro Herrera, trocha al Río Yaveri, cerca al Arboretum de Jenaro Herrera, 15 m tree in low forest, flowers greenish yellow, 20 Aug. 1976, *Revilla* 1226 (holotype, MO; isotype, HBG). Figures 8, C & D; 12.

Arbor, 20 m. Ramuli glabri, sed apicibus foliiferis sericeis, cicatricibus conspicuis munitis. Folia alterna, conferta ad apices ramulorum, glabra (juvenalia adpresse pubescentia), chartacea, apice rotundo vel obtuse acuto, basi petiolo attenuato, elliptica, ca. 20 × 9 cm. Laminae super opacae, costa elevata, venatione secundaria leviter elevata, venatione tertia immersa; subtus opacae, venatione magis elevata. Petioli 3–4 cm longi, peranguste alati laminis decurrentibus. Inflorescentiae axillares, parvae longiores quam petiolis. Flores conferti ad apices ramulorum inflorescentiarum, minute adpresse pubescentes, depresso globosi. Tepala 6, aequalia, parva, ca. 0.4 × 0.2 mm, minute adpresse pubescentia. Stamina 3, exserta, filamentis connatis pubescentibus, antheris glabris, exsertis per anthesim, 2-loculatis. Ovarium glabrum, ovoideum, sensim in stylo attenuatum. Fructus ignoti.

Tree, 15 m. Twigs glabrous, rather thick (5–7 mm diam. immediately below the leaves), with conspicuous leaf scars, the bark gray. Tips of branches with dense, brown, sericeous pubescence. Leaves alternate, clustered at tips of branches, ca. 20 × 9 cm, young ones with some appressed pubescence, glabrous at maturity, chartaceous, elliptic, the tip rounded or bluntly

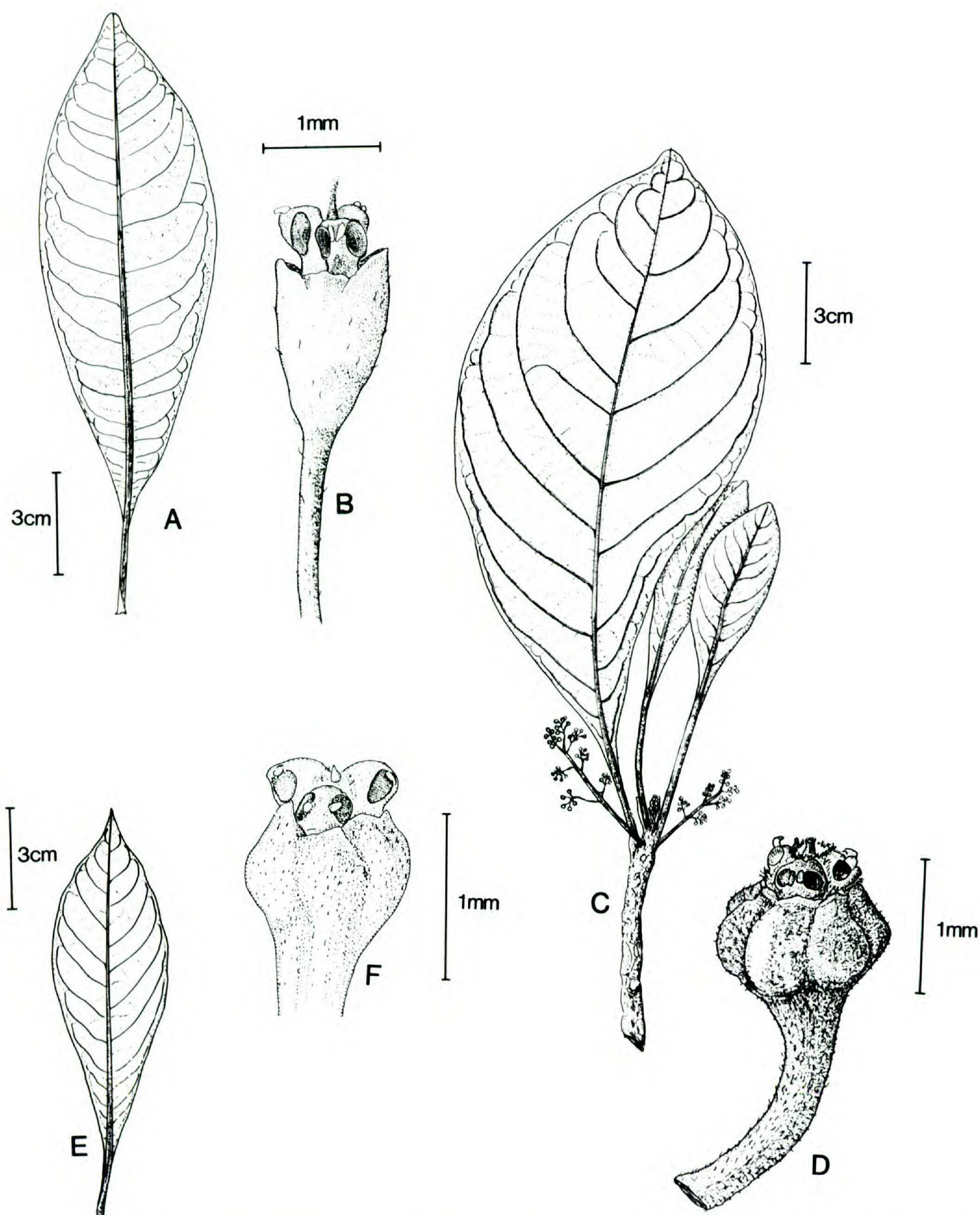


FIGURE 8. A–B. *Mezilaurus navalium*. —A. Leaf. —B. Flower. C–D. *M. opaca*. —C. Habit. —D. Flower. E–F. *M. palcazuensis*. —E. Leaf. —F. Flower.

acute, the base gradually narrowed onto the petiole, green, opaque above, the midvein elevated, the secondary veins slightly elevated, the tertiary venation more or less immersed, not easily visible; lower surface also opaque but with the venation more elevated; petioles 3–4 cm long, with narrow wings of the decurrent laminae. Inflores-

cences compound racemes in the axils of deciduous bracts, slightly longer than the petioles, when young rather densely appressed pubescent, at anthesis less so. Bracts and bracteoles deciduous. Flowers clustered at the tips of inflorescence branchlets, with some appressed pubescence, depressed globose, constricted at the apex, ca. $1.5 \times$



FIGURE 9. Distribution of *Mezilaurus palcazuensis* (●), *M. pyriflora* (■), *M. quadrilocellata* (●), *M. sprucei* (▲), and *M. navalium* (○).

1.5 mm (including the exerted stamens). Tepals 6, equal, pointing inwards, wider than long, ca. 0.4 mm wide, ca. 0.2 mm long, with some appressed pubescence. Floral tube short, ca. 0.5 mm long, with a pubescent ring in the upper part. Stamens 3, 2-celled, ca. 1 mm long, the anthers glabrous, exerted at anthesis, the cells on a dorsal ridge, the valves opening back-to-back; filaments broad, connate, pubescent, ca. 0.6 mm long. Ovary glabrous, ovoid, gradually narrowed into the style; style exerted beyond stamens; stigma a small plate. Fruit unknown.

Mezilaurus opaca is rather similar to *M. synandra*, but differs from that species by its smaller flowers and the leaf characters mentioned in the key. Béguin et al. (1985) reported *M. synandra* from the Jenaro Herrera Arboretum. It is possible that this specimen represents *M. opaca*, but I have not seen it.

Mezilaurus palcazuensis van der Werff, sp. nov.
TYPE: Peru. Cerro de Pasco: Selva Central, Palcazu Valley, elev. 300–600 m, 7 Dec.

1984, *Hartshorn, Quijano & Mateo 2691* (holotype, MO). Figures 8, E & F; 9.

Arbor, 25 m. Ramuli teretes, glabri vel prope apicem adpresse pubescentes, cicatricibus foliarum conspicuis munitis. Gemma terminalis sericea. Folia chartacea, conferta ad apices ramulorum, adulta glabra, juvenalia adpresse pubescentia, obovata vel anguste obovata, apice acuta, basi attenuata, 10–15 × 3–4 cm. Costa elevata; nervi laterales et venatio immersa, haud conspicua. Petioli ca. 1 cm longi. Inflorescentia axillaris, minute adpresseque pubescens, paniculata, 4 cm longa, floribus congestis ad apices ramulorum inflorescentiae, sessilibus vel quasi sessilibus. Flores minuti adpresseque pubescentes, obconici, ca. 1.5 mm longi. Tepala 6, erecta, parva, 0.3 mm longa. Stamina 3, 0.8 mm longa, per anthesin exserta. Antherae 2-locellatae, glabrae, extrorsae. Filamenta connata, glabra praeter aream parvam pubescentem in superficie ventrale. Ovarium globosum, glabrum. Fructus ignoti.

Tree, 25 m. Twigs terete, glabrous or with some appressed pubescence near tip, with conspicuous leaf scars. Terminal bud sericeous. Leaves chartaceous, clustered at the tips of branches, with some appressed pubescence when immature, glabrous when mature, obovate or narrowly obovate, the tip acute, the base gradually narrowed into the petiole, 10–15 × 3–4 cm; costa raised on both surfaces; secondary veins and reticulation immersed, not obvious; petioles ca. 1 cm long. Inflorescence axillary, 4 cm long, paniculate, minutely appressed pubescent, the flowers clustered at the tips of the lateral branches, sessile or nearly so. Flowers minutely appressed pubescent, sessile, ca. 1.5 mm long. Tepals 6, erect, 0.3 mm long. Fertile stamens 3, 2-celled, exserted at anthesis; anthers extrorse, situated on a dorsal ridge, opening back-to-back; filaments united, glabrous. Staminal glands and staminodia lacking. Fruit unknown.

Mezilaurus palcazuensis is only known from the holotype, consisting of a small twig with few leaves and one inflorescence. It is therefore quite likely that the description does not embrace the morphological variation of this species. Noteworthy features are the acute leaf tips and the sessile flowers, both unusual characters in the genus. The leaves are also thinner than in other species of *Mezilaurus*, but with only one specimen available, it is not certain whether this is a distinguishing character.

Similar sessile flowers occur also in *M. caatingae*, known from caatinga forest along the Rio Negro, which differs in having larger flowers and coriaceous, rounded leaves with inrolled margins.

Mezilaurus pyriflora van der Werff, sp. nov. TYPE: Brazil. Amazonas: São Paulo de Olivença, basin of creek Belem, 26 Oct.–11 Dec. 1936, *Krukoff 8711* (holotype, NY; isotype, MO, GH). Figures 10, A & B; 9.

Arbor, 25 m alta. Ramuli crassi, ad 1 cm diametro, teretes, cicatricibus conspicuis foliorum delapsorum notati, apicibus dense adpresseque puberulis, glabrescentibus. Gemma apicalis dense pubescens. Folia conferta ad apices ramulorum, chartacea, obovata, in dimidio inferiore persensim dilatata, in dimidio superiore abrupte dilata, 40–60 × 14–18 cm, apice acuta, basi abrupte angustata, rotunda vel subcordata. Costa super et subtus elevata; nervi secundarii 20–25, super immersi, subtus elevati; nervatio tertia super obscura, subtus elevata. Lamina glabra praeter costam basimque laminae adpresse puberulam. Petioli 1 cm longi, 5 mm diametro, adpresse puberuli, cristis duabus lateralibus. Inflorescentia axillaris, subterminalis, anguste pyramidalis, ramulis basalibus perlongioribus quam terminalibus, adpresse pubescens. Flores parvi (0.9 mm × 0.9 mm), glabri, pyriformes. Pedicelli pubescentes, 1.5–2 mm longi. Stamina fertilia 3, inclusa, 0.8 mm longa, 2-locellata. Filamenta libera, pubescentia. Locelli parvi, terminales, aperientes ad apicem. Ovarium depresso globosum, glabrum, 1.2 mm latum, 1 mm longum. Staminodia 6. Glandulae filamentorum nullae. Fructus ignoti.

Tree, to 25 m tall. Twigs thick (diam. 1 cm 4–5 cm below tip), terete, with conspicuous leaf scars, the tip with gray, minute and appressed pubescence, becoming glabrous with age. Terminal bud densely gray pubescent. Leaves clustered at tips of branches, firmly chartaceous, obovate, the basal half of the lamina widening very gradually, the apical half rather abruptly widened, large (40–60 × 14–18 cm at maturity), the tips acute, gradually narrowed towards the base, but the base abruptly narrowed, rounded or almost subcordate, mostly glabrous, with some appressed pubescence on midrib or near base, the midrib thick (5 mm wide), raised on both surfaces, the main lateral veins (20–25 pairs) immersed above and elevated below, the tertiary venation scarcely visible above, raised below; petioles ca. 1 cm long, 5 mm thick, densely appressed pubescent, the lamina decurrent as two narrow ridges. Inflorescences axillary, subterminal, pyramidal, the basal branchlets much longer than the terminal branches (the longest ca. 10 cm long, decreasing to ca. 1 cm), the main axis and branchlets with appressed pubescence; bracts and bracteoles pubescent. Flowers arranged spicately along branchlets, glabrous, often reflexed, pear-shaped, ca. 0.9 mm long, 0.9 mm wide. Pedicels pubescent, especially near the base, 1.5–2 mm long at anthesis. Fertile stamens 3, ca.

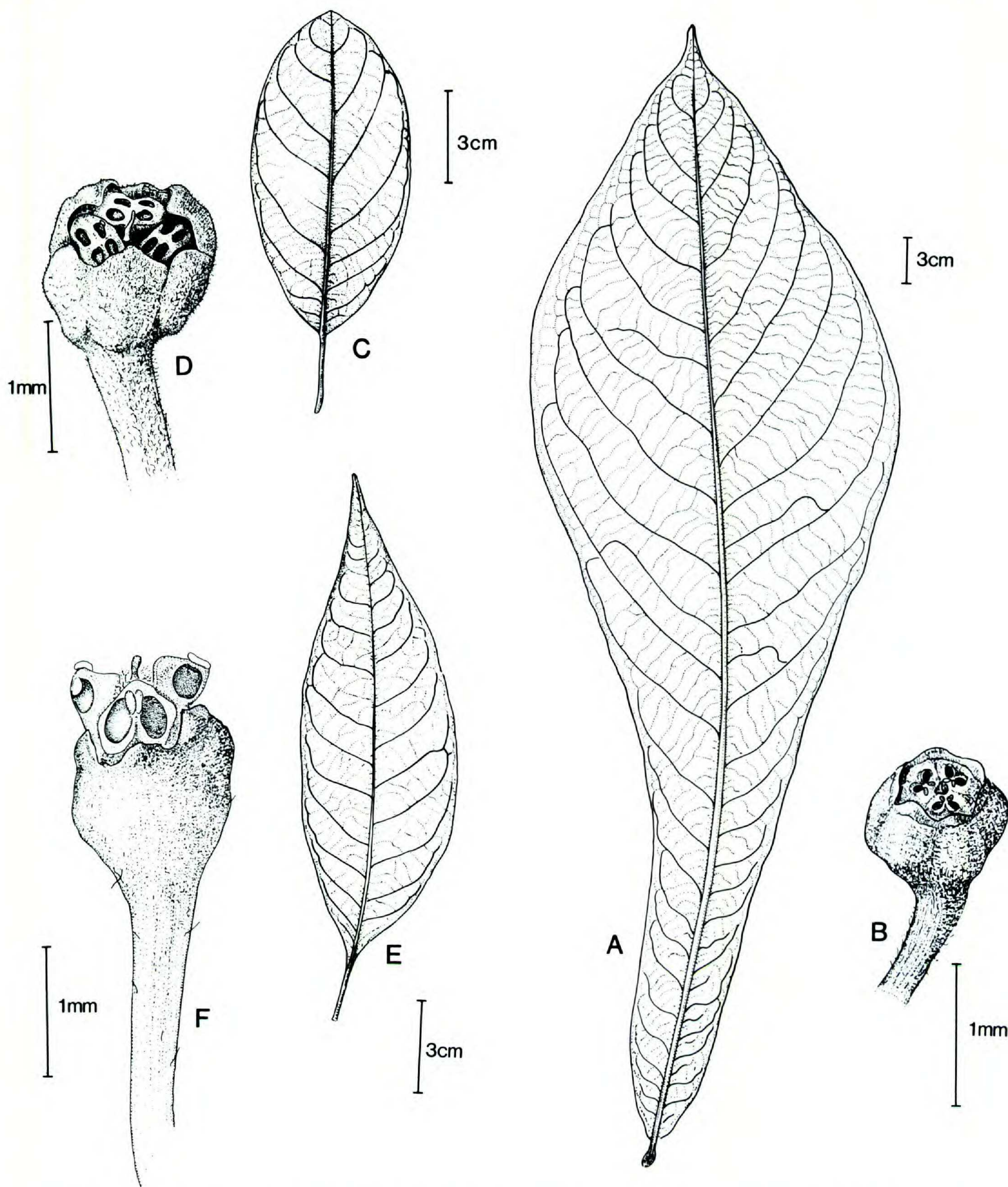


FIGURE 10. A–B. *Mezilaurus pyriformis*. — A. Leaf. — B. Flower. C–D. *M. quadrilocellata*. — C. Leaf. — D. Flower. E–F. *M. sprucei*. — E. Leaf. — F. Flower.

0.8 mm long, included; filaments free, pubescent; anther cells minute, terminal, opening towards the tip. Ovary depressed globose, glabrous, ca. 1.2 mm wide, ca. 1 mm long. Staminodia 6, representing the outer 6 stamens, pubescent, ca. 0.5 mm long. Staminal glands lacking. Fruit unknown.

Paratype. BRAZIL. AMAZONAS: Fróes 12152 (NY).

Mezilaurus pyriformis is known only from two collections from the vicinity of São Paulo de Olivença. Leaf shape, the short, pubescent pedicels, the included, short anthers and the pear-shaped flowers (with the apical valves of the anthers

mimicking the dried crown of a pear) separate this species from *M. mahuba* and *M. thoroiflora*. The Fröes collection in NY bears the annotation "wood causes injury to the skin."

The two collections of *Mezilaurus pyriflora* had been annotated as Euphorbiaceae and Ochnaceae; because Krukoff's collections were widely distributed, it is possible that duplicates of *M. pyriflora* are misidentified in additional herbaria.

***Mezilaurus quadrilocellata* van der Werff, sp. nov.**

TYPE: Colombia. Antioquia: Chigorodó. Tree, 20 m. Flowers white. 100–200 m, *M. Garcia Barriga* 17626 (holotype, GH; isotypes, AAU, US). Figures 10, C & D; 9.

Arbor, 20 m. Ramuli crassi, 4–5 mm diametro, teretes, glabri apicibus foliiferis tomentellis. Folia conferta ad apices ramulorum, glabra, elliptica vel leviter obovata, chartacea, basi cuneata, apice rotundata, ca. 15 × 8 cm, petiolis 2–4 cm longis, tomentellis, margine cartilaginea, leviter incrassata. Venatio super immersa, subtus tomentella costa manifeste elevata, nervis lateralibus (6–8) elevatis, nervis basalibus marginem attingentibus. Inflorescentiae axillares, foliis breviores, anguste pyramidatae, 6–9 cm longae, tomentellae. Flores parvi, ca. 1.5 mm longi, pedicellis 2–3 mm longis, tomentellis. Tepala 6, 3 interioria 3 exterioribus duplo longiora, erecta, apicibus incurvatis, tepala exteriora ovata, ca. 0.6 mm longa, interiora ovata, ca. 1.2 mm longa, omnia glabra. Stamina 3, ca. 1.0 mm longa, filamentis pubescentibus, sine glandulis, antheris quadrilocellatis glabris, apicibus antherarum incurvatis. Stamina 3, parva, ca. 0.5 mm longa, dense pubescentia. Ovarium ellipsoideum, glabrum, 1 mm longum, sensim in stylum attenuatum. Fructus ignoti.

Tree, 20 m tall. Twigs thick, 4–5 mm diam. immediately below the leaves, terete, glabrous except for the rufous tomentellous leaf-bearing apex. Leaves clustered at tips of branches, glabrous, elliptic or slightly obovate, ca. 15 × 8 cm, the base cuneate, the apex rounded, the margins cartilaginous and slightly thickened, the venation immersed above, the midrib prominently raised and tomentellous on lower surface, the lateral veins (6–8) less prominently raised, the basal ones reaching the margin, the upper ones arcuate and not reaching the margin; tertiary venation slightly raised, petioles 2–4 cm long, rufous tomentellous. Inflorescences axillary, shorter than the leaves, narrowly pyramidal, 6–9 cm long, tomentellous. Flowers small, ca. 1.5 mm long; pedicels 2–3 mm long, tomentellous; flower tube and tepals glabrous outside. Tepals 6, the outer ones half as long as the inner ones, erect, with tips curved inward; outer tepals ca. 0.6 mm long, ovate, inner ones ca. 1.2 mm long, ovate, gla-

brous. Ovary ellipsoid, gradually narrowed into the style, 1 mm long, glabrous. Fertile anthers 3, ca. 1 mm long; filaments rather densely pubescent; anthers 4-celled, glabrous, the tips bent inward, forming a flat shield exposed at anthesis; anther cells situated on this shield. Fertile anthers alternating with 3 small (ca. 0.5 mm), slender, densely pubescent staminodia. Fruit unknown.

Mezilaurus quadrilocellata is known only from the type collection in northern Colombia, not far from the Panamanian border and the Caribbean. Further discussion is given under *M. glaucophylla*.

***Mezilaurus sprucei* (Meissner) Taubert ex Mez,** Arbeiten Königl. Bot. Gart. Breslau 1: 112. 1892. *Acrodiclidium sprucei* Meissner, DC. Prodr. 15(1): 86. 1864. *Silvia sprucei* (Meissner) Mez, Jahrb. Königl. Bot. Gart. Berlin 5: 119. 1889. *Mezia sprucei* (Meissner) Kuntze, Revis. Gen. Pl. 2: 574. 1891. TYPE: Brazil. Amazonas: San Gabriel de Cachoeira, Rio Negro, May 1852, *Spruce* 2323 (lectotype, chosen by Kostermans, K; isotypes BM, C, NY, U). Figures 10, E & F; 9.

Mezilaurus maguireana C. K. Allen, Mem. New York Bot. Garden 10: 58. 1963. TYPE: Venezuela. Amazonas: Río Guainía, Maroa, *Maguire et al.* 41698 (holotype, NY; isotype, GH).

Small tree, to 10 m tall. Twigs terete, glabrous, the terminal bud densely yellowish strigose. Leaves clustered at the tips of branches, papyraceous, glabrous, elliptic, 12 × 5 (20 × 9) cm, the base acute, the apex acute or acuminate; lateral veins 10–15 pairs, slightly elevated or immersed on upper face, raised on lower surface, the reticulation slightly raised on both surfaces; petioles to 3 cm long, flat, bordered by a narrow ridge, the very base of the petiole round and thickened. Inflorescences 5 or 6, terminal, glabrous, slender, paniculate, shorter than or exceeding leaves, to 15 cm long; branchlets subtended by strigose bracts 1.5 mm long; floral bracts also strigose, but shorter. Flowers glabrous, ± umbellately arranged at the tips of the branchlets, ca. 2 mm long, the pedicels to 1.5 cm long. Tepals 6, equal, erect, ca. 0.5 mm long. Stamens 3, ca. 1.2 mm long, exserted; anthers free and somewhat divergent, 2-celled, the cells large, opening back-to-back; filaments pubescent, connate. Ovary ellipsoid, ca. 0.8 mm long, abruptly narrowed into the slender, ca. 1 mm

long, style. Flower tube pubescent within. No staminal glands or staminodia. Fruits not seen.

Additional specimens examined. VENEZUELA: 30 km N of Puerto Ayachucho, *Guanchez* 255 (TFAV). AMAZONAS: San Carlos de Río Negro, *Clark & Maguirino* 7784 (MO), 8091 (MO); Cerro Neblina base camp, *Gentry & Stein* 46836 (MO); BRAZIL. AMAZONAS: Río Negro above Camanaus, *Prance et al.* 16042 (NY). PERU. LORETO: Iquitos, near Picuruyacu, *Revilla* 106 (G, MO); Requena, Jenaro Herrera, *Vasquez & Jaramillo* 984 (MO).

Mezilaurus sprucei can be recognized easily by its glabrous, acute or acuminate leaves, lax inflorescences, and especially by the flowers with long pedicels. The Revilla collection from Peru has short pedicels (5 mm long) but agrees in other characters with *Mezilaurus sprucei*.

I tentatively place *Mezilaurus maguireana* in synonymy under *M. sprucei*. The type does not agree completely with the typical *M. sprucei*; the inflorescences are stiffer, the flowers have pedicels only 5 mm long, the reticulation is less raised on the upper leaf surface, and the leaf apices are less acuminate. These differences are only of degree and the few collections of *M. sprucei* at hand probably do not show the full range of variation in the species. In what I consider important characters (acute leaves, long petioles, glabrous, subumbellately arranged flowers, and connate filaments), *M. maguireana* agrees with *M. sprucei*.

I found that in old flowers the anthers become divergent, although the filaments remain connate.

Mezilaurus subcordata (Ducke) Kosterm., Meded. Bot. Mus. Herb. Rijks Univ. Utrecht 25: 40. 1936. *Silvia subcordata* Ducke, Arch. Jard. Bot. Rio de Janeiro 5: 115. 1930. TYPE: Brazil. Pará: dry upland forest of Jumanda River, *Ducke RB* 19974 (holotype, RB; not seen; isotype, U). Figures 11, 12.

Medium-sized tree to 20 m. Twigs terete, with conspicuous leaf scars, the terminal bud densely and minutely appressed pubescent, this disappearing rapidly as twig matures. Leaves clustered near apices of branches, rarely few leaves persisting on older twigs, the leaves glabrous, coriaceous, slightly ovate or elliptic, ca. 15 × 7 cm, the base rounded, the apex obtuse; midrib, secondary veins (8–12 pairs), and ultimate reticulation slightly raised above, more prominently below; petioles 3–5 cm, rarely only 1 cm long. Inflorescences axillary near tips of twigs, pyramidal, rather laxly flowered, appressed tomentel-

lous, 5–12 cm long; branchlets slender, distant, to 1.5 cm long, the flowers clustered near their tips. Bracts and bracteoles deciduous. Pedicels slender, tomentellous, 1–1.5 mm long. Flowers globose, puberulous, ca. 1.5 mm long. Tepals 6, equal, erect, ca. 0.6 mm long. Stamens 3; ca. 1 mm long; filaments ca. 0.7 mm, pubescent, connate; the 2-celled anthers exerted like small horns from the flower tube, glabrous; anther cells large, lateral-introrse, opening toward the tip. Ovary glabrous, ca. 1 mm long; style exerted, the stigma minute. Staminal glands and staminodia lacking. Fruit (fide Kostermans, 1938) ellipsoid, 2.5–3 cm long, 1.5 cm diam., subtended by a small, platelike cupule (4–5 mm diam.) with subpersistent tepals.

Additional specimens examined. PERU. MADRE DE DIOS: Tambopata, *Gentry et al.* 46116, 45952 (MO).

Mezilaurus subcordata is collected rarely and known to me only from an isotype and two recent collections in Peru. Very possibly it is not a true disjunct—it may also occur in the intervening area, since a tree with green flowers 1.5 mm long can easily be overlooked. The Peruvian collections come from a tree plot in which every tree was sampled, regardless of whether it was fertile or not.

The description is based on the U isotype. The Peruvian specimens differ in having glabrous flowers and slightly thinner leaves. I find these differences too weak for recognition of a new taxon, but additional collections may show the Peruvian plants to be distinct.

Mezilaurus subcordata can be recognized readily by its long petioles and rounded leaf bases; it is also the only species in the genus with lateral-introrse anther cells.

Mezilaurus synandra (Mez) Kosterm., Meded. Bot. Mus. Herb. Rijks Univ. Utrecht 25: 40. 1936. *Silvia synandra* Mez, Feddes Repert. 16: 306. 1920. TYPE: Brazil. Amazonas: Manáos, dry upland forest near Pensados, *Ule* 8835 (lectotype, B, fide Kostermans, not seen; isotype, L). Figures 13, A & B; 12.

Tree, to 15 m tall. Twigs terete, glabrous, often with conspicuous leaf scars, the terminal buds yellowish strigose-sericeous. Leaves clustered at tips of branches, glabrous, elliptic or slightly obovate, 8–20 × 4–10 cm, the base cuneate or acute, the tip rounded, lateral veins 10–15 pairs, ± immersed above, slightly raised below, the tertiary



FIGURE 11. *Mezilaurus subcordata*.—A. Habit.—B. Flower.

venation reticulate and slightly raised on both surfaces, the midvein raised below, triangular in diameter; petioles conspicuous, 3–5 cm long, glabrous, flat or with 2 narrow ridges on upper side. Inflorescences subterminal, much shorter than leaves, ca. 3 cm long, the flowers in small (4–5 flowered) clusters at the ends of few lateral branchlets, minutely strigose. Bracts and bractlets early deciduous, not seen. Flowers sparsely and minutely strigose, depressed globose, as wide as long or wider than long, the flower tube narrowed toward the tip (ca. 2 mm wide and 1.7 mm long on unpressed flowers). Tepals 6, equal, erect, scalelike, ca. 0.4 mm long, ca. 0.8 mm wide. Stamens 3, ca. 1.9 mm long, exserted, the

anthers glabrous, 2-celled, the cells opening lateral-apically or apically; filaments connate, pubescent. Ovary pubescent, ca. 1–2 mm long; style ca. 0.3 mm long. Staminal glands and staminodia lacking. Fruit ovoid, ca. 2 cm long, 1 cm wide, subtended by a small, platelike cupule.

Additional specimens examined. BRAZIL. AMAZONAS: Manáos, Igarape da Cachoeira, Baixa do Tarumã, *Chagas s.n.* = MG 21.108 (NY); Manáos, Parque 10 de Novembro, *Coelho s.n.* = INPA 3934 (NY); Manáos, Pensador, *Ducke 233* (F, NY), *Ducke 233, second collection* (US); Manáos, *Ducke RB 23964* (G, US); Manáos, Pensador, *Ducke RB 25092* (US); Manáos, Cachoeira, Alta do Tarumã, *Rodrigues & Lima 3047* (NY). Reported by Béguin et al. (1985) from the Arborétum Jenaro Herrera, Loreto, Peru.



FIGURE 12. Distribution of *Mezilaurus opaca* (●), *M. subcordata* (▼), *M. synandra* (■), and *M. thoroflora* (●).

Mezilaurus synandra is only known from dry, low forest on terra firme, near Manaus and one collection in Peru. Several collections indicate that it occurs in secondary vegetation. When flowering, *M. synandra* can be recognized easily by its short inflorescences and broad, depressed-globose flowers, which otherwise occur only in *M. opaca*. Fruiting or sterile collections are rather similar to *M. itauba*, which has, however, a larger inflorescence, generally smaller leaves, and the upper leaf surface dull, not shiny, with less prominently raised reticulation.

***Mezilaurus thoroflora* van der Werff, nom. nov.**

Basionym: *Licaria maguireana* Allen, Bull. Torrey Bot. Club 75: 315. 1948. *Misanteca maguireana* (Allen) Lundell, Wrightia 4: 100. 1969. *Clinostemon maguireanum* (Allen) Kurz, J. Arnold Arbor. 60: 520. 1979. TYPE: Guyana: Mazaruni Station, Forestry Dept. Brit. Guiana 2956 (F220) (holotype, NY; isotype, K). Figures 13, C & D; 12.

Tree, ca. 25 m tall. Twigs thick, terete, the tip densely and minutely appressed pubescent, be-

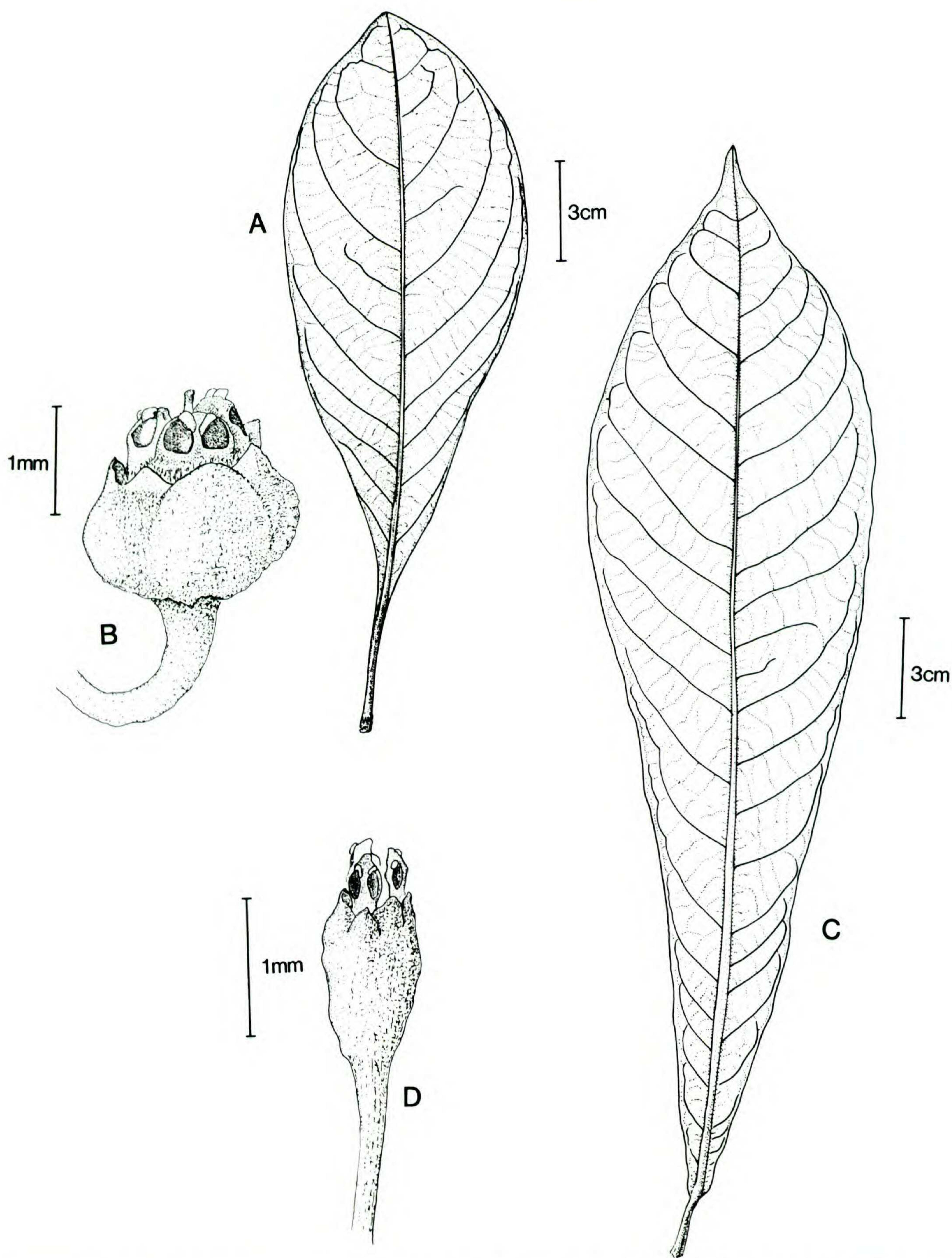


FIGURE 13. A—B. *Mezilaurus synandra*.—A. Leaf.—B. Flower. C—D. *M. thoroflora*.—C. Leaf.—D. Flower.

coming glabrous with age. Terminal bud yellowish pubescent. Leaves clustered at the tips of branches, coriaceous, obovate, gradually narrowed toward base, the base abruptly rounded,

the apex acute or shortly acuminate, 30–60 × 12–18 cm, pinnately veined, 15–25 pairs of lateral veins, these immersed above, but elevated below. Midrib thick, ca. 7 mm wide, raised on

both surfaces. Tertiary venation not visible above, but raised below. Lamina glabrous above, except along midrib, sparsely appressed pubescent below, especially near the base and along midrib. Inflorescences in axils of aborted leaves, subterminal, appressed gray-pubescent when young, with few hairs at anthesis, 30–50 cm long, lateral branchlets 2–3 cm long over the entire length of cylindrical inflorescence, these with scattered hairs, bracts and bractlets, strigose, persisting at anthesis. Flowers clustered toward the tips of branchlets, glabrous, ellipsoid, ca. 1.5 mm long, 1 mm wide, the anthers ca. 0.5 mm exserted, pedicels 4–8 mm long. Tepals 6, equal, erect, scalelike. Fertile stamens 3, ca. 1 mm long, the filaments free, pubescent, ca. 0.5 mm long, the 2-celled anthers glabrous, exserted, the large cells extrorse and opening apically. Ovary glabrous, ellipsoid, ca. 0.8 mm long, abruptly narrowed into the equally long style. Staminodia 9, pubescent, the outer six slightly sagittate, the inner three lanceolate. Infructescence ca. 60 cm long, the fruit ellipsoid, ca. 1.7×1 cm, subtended by a thin platelike cupule, ca. 0.6 cm diam.

Paratype. Guyana, Mazaruni Station, Forest Dept. Brit. Guiana 2704 (K).

Mezilaurus thoroflora is known only from a few collections in Guyana. Diagnostic for this species are the long-pedicelled flowers, the large exserted anthers, and the uniform, short, lateral branchlets of the inflorescence. Vegetatively, *M. thoroflora* closely resembles *M. pyriflora*, which has leaves with long and narrow basal parts; they rather abruptly widen at the middle of the lamina, not gradually as in *M. thoroflora*.

The illustration in Kubitzki et al. (1979) of *M. thoroflora* (as *Clinostemon maguireanum*) is not representative of material I have seen. The two collections from the Forest Department of British Guiana do not have such pronounced cordate leaf bases and do not have the lower branchlets of the inflorescences much longer than the upper ones, as shown in Kubitzki et al. (1979).

Kostermans (1938) cited two collections (*Monteiro Costa* 323, *Kaufmann* 605, both in F) under *M. lindaviana*. In my opinion these specimens belong to *M. thoroflora* or are very close to it. They have considerably smaller leaves than the type of *M. thoroflora*, but leaf shape is quite similar. *Monteiro Costa* 323, a flowering specimen, shows exserted anthers and staminodia, and this clearly indicates *M. thoroflora*. Pedicels are shorter and leaves smaller than in *M. thoroflora*,

but it is likely that the few available collections do not show the full range of vegetative variation.

Because the combination *Mezilaurus maguireana* already exists, it was necessary to create a new epithet for *Licaria maguireana*. The new epithet *thoroflora* is derived from the Greek “thoros,” semen, and “flos,” flower, in reference to resemblance between the small, long-pedicelled flowers and spermatozoa.

IMPERFECTLY KNOWN SPECIES

Mezilaurus sp. A.

A collection made by J. da Silva Costa (*RB* 180796) in the State Mato Grosso, Brazil, probably represents an undescribed species. The locality data suggest it was collected in cerrado vegetation as a 9 m tree. The most distinguishing characters are found in the leaves, which are densely gland-dotted on the upper surface, chartaceous, and have a few appressed hairs on the lower surface. The young flower buds are glabrous. This is clearly not the other cerrado species, *M. crassiramea*, which has pubescent leaves, and the gland-dotted upper leaf surface has not been found in other *Mezilaurus* species. I prefer to wait with a formal description until flowering material is available.

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